FOOD INDUSTRIES

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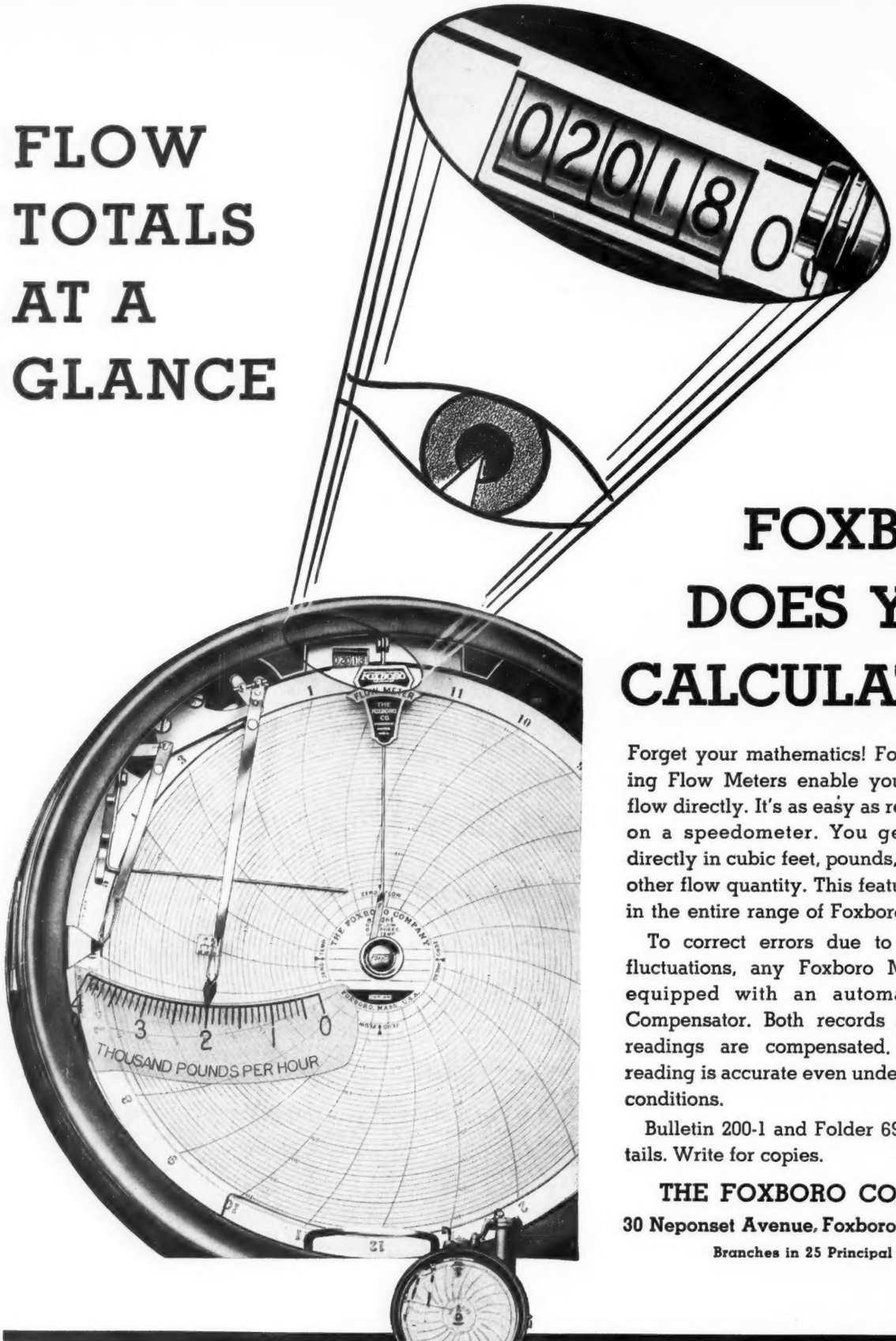

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for

December, 1936

Volume 8, Number 12

FOOD INDUSTRIES

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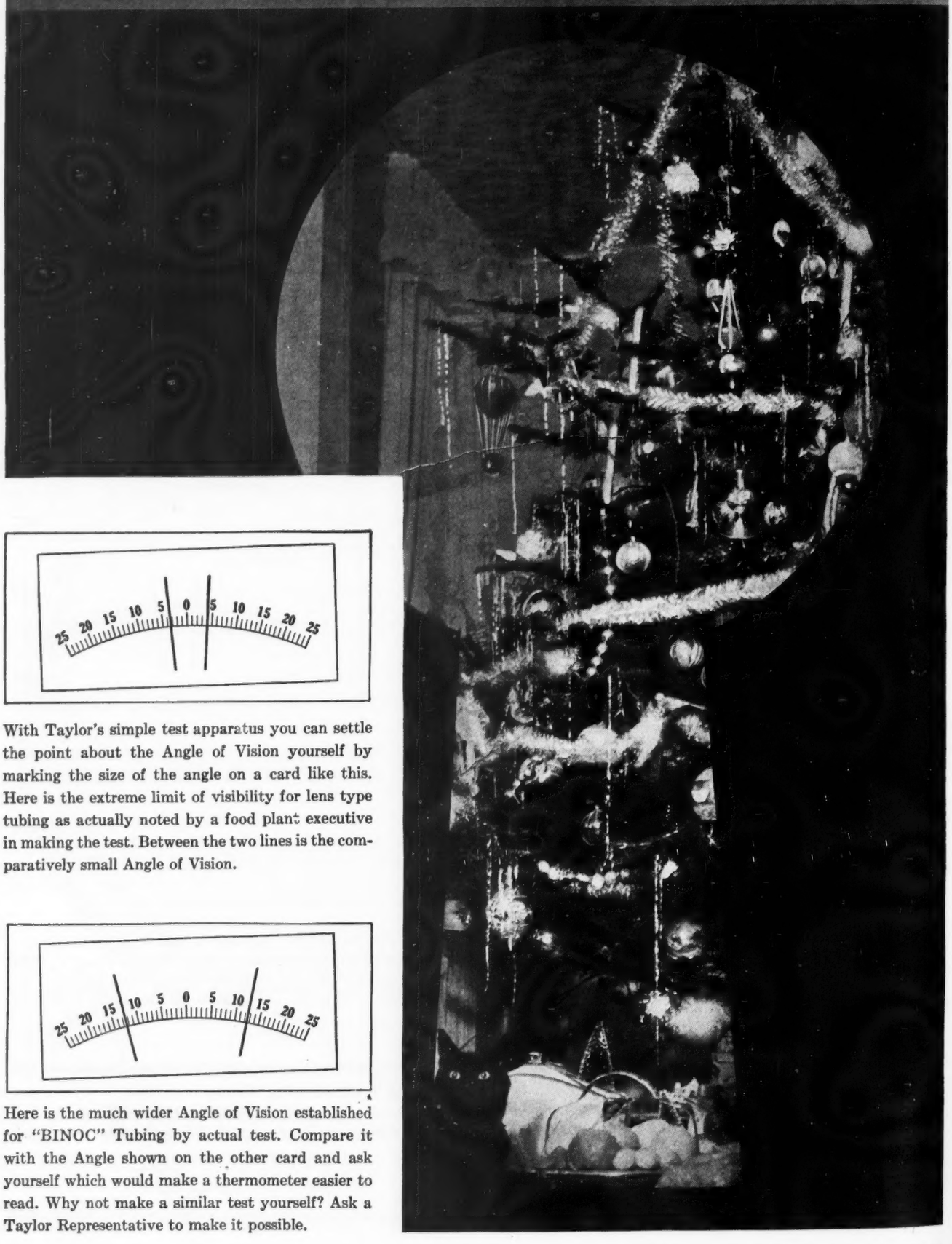
JOHNNY STEALS A PEEK—



With Taylor's simple test apparatus you can settle the point about the Angle of Vision yourself by marking the size of the angle on a card like this. Here is the extreme limit of visibility for lens type tubing as actually noted by a food plant executive in making the test. Between the two lines is the comparatively small Angle of Vision.

Here is the much wider Angle of Vision established for "BINOC" Tubing by actual test. Compare it with the Angle shown on the other card and ask yourself which would make a thermometer easier to read. Why not make a similar test yourself? Ask a Taylor Representative to make it possible.

FOOD INDUSTRIES

DISTRIBUTION • ENGINEERING • PRODUCTION

Established 1928—McGraw-Hill Publishing Company, Inc.

Vol. 8, No. 12

Laurence V. Burton, Editor

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DECEMBER 1936

The Talk of the Industry

WE SEE by the papers that there was an election along in the fore part of November. We thought it was a census.

WE had hoped we could forget politics for a time and attend strictly to business. And then along comes the Nov. 3 landslide. If this sort of thing keeps up, it will be bad for the professional politician. At the present rate, in four more years every business man will soon be forced to become an adept in politics.

ONE of the problems of the month is deciding whether or not we are being kidded. We have received a letter addressed to the Social Editor of Food Index. Its contents, confirming a previous business-like telephone conversation, is ample evidence that the letter came to the

right place. If this sort of thing keeps up, we will have to buy a two-button cutaway and striped trousers, plus other social accessories. And gosh, how we dread it!

DEALINGS with the United States Government are taking on a complex, nay, almost sinister, aspect, A friend in a certain bureau in Washington had expressed a desire to acquire a few reprints of an article that had appeared previously in FOOD INDUSTRIES. In view of certain past favors, the logical thing was to donate them. This was done before we realized that he had started in motion the wheels of the government's purchasing department.

And now, after almost half a year has elapsed, this small donation appears to be a live issue. The last exchange of correspondence involved a request for an invoice rendered in duplicate on the government's form. And so we laboriously have filled out the form marking it "No Charge." Verily, it were easier to sell than to give.

THE absolute zero in sales promotion for flour and the best provocative of a wan and sickly smile this month comes from a handout from North Dakota.

"Canned Dog Food.
"Analyses & Standards

"Canned dog food has recently become an important commercial item. It has provided a means for the utilization of meat scrap which has hitherto been converted into tankage. It has also provided some manufacturers with another excellent means for marketing water to the consuming public. The meat products employed are generally of the most inferior quality, varying from wholesome, sound meat scraps to intestinal material and lung tissue. By the use of a cereal filler, a semi-solid product with a moisture content as high as 80 per cent has been found on the market. It is apparent that the consumer is paying as high a price for canned meat scrap as for rather expensive cuts at his local meat market . . .

State Food Commissioner and Chemist.

Buy "Dakota Maid" Flour.

"IF we continue to increase the speed of our existence at the present rate, it will not be many generations before a man will have lived a lifetime when he reaches the age of twenty. The man of today who attains

the age of fifty has in reality lived one hundred years (in experience)"—Dr. R. C. Buerki of Madison, Wis., speaking.

If the good and wise doctor were to spend a decade on your job, he would call it two hundred years.

A FRIEND reports what appears to be the lowest point in inept food dispensing. A customer ordered beer at a soda fountain. The dispenser, a young lady obviously employed for some reason other than her skill, opened a warm bottle of beer that was standing between the hot coffee urns, the electric toasters and several other heating devices that are used

for making ice cream sodas. Then she poured the hot beer into a tumbler of cracked ice.

Its dollars to doughnuts that two concerns lost a customer forever, the brewer and the fountain.

SPEAKING of inept food dispensing, our pride took an awful fall last week. After we had related to our host at a tolerably swanky restaurant all about the fond memories of Coquille St. Jacques as served in Brittany, he discovered them on the bill of fare and insisted on ordering them. Coquille St. Jacques (pronounced Kokeeya Sin Zhock), if you must know, is a fancy name for baked deviled crabs, a dish to which this department confesses something more than a decided partiality.

Imagine our chagrin and confusion when the food arrived. It consisted of shrimp in a white sauce, overlayed with mashed potatoes, all baked in an imitation crab-shell. Nary a trace of crab! Phooey!

Hereafter we'll stick to the old luncheon standby, graham crackers and milk.

Hors d'Oeuvres

• Says an authority: "Hire a chorus girl and you look for bodily symmetry, the cut of her hair, texture of her skin, age, poise, temperament and grace of movement. Hire a woman for work in your plant and you should look for the same things and many others."—What others?

• *The production manager of a doughnut factory has a right to call himself a big shot. He's in charge of the hole works.*

• Can you tell us the relation between the viability and poppability of popcorn? We asked the office boy, but he told us to go to hellability.

• *Next year lobsters coming from Maine will carry a tag certifying their point of origin. Why not just stick a sunflower in their claws. Or would Vermont be jealous?*

• Chickens were first bred as alarm clocks, then for fighting, later for meat and eggs and now for hardihood. Apparently the chickens have never had anything to do about it.

• *If, when your wife's menu calls for biscuits, she sets on the table something that will break a plate when dropped from an altitude of two feet, don't criticize her cooking. Perhaps she's French. "Biscuit" is a French word consisting of "bis," twice, and "cuit," baked, the original biscuit being baked twice to make it hard and dry.*

• Here's one for Emily Post. The Djukas, who are fond of semi-putrid fish, boil the fish and eat it like corn-on-the-cob. The flesh and bones seem to go into the mouth at one side and the bones seem to be sloughed out on the other side simultaneously. Bet you can't do it.

• *A headline says: "Chayote Gains Favor." We thought it was some kind of animal from the Western plains, too. But it's really a California vegetable looking somewhat like a corrugated pear and light yellow in color. People eat it.*

• Take care what you say about the onion. You may run afoul of the Onion Anti-Defamation Committee of America, which asked two professors to eat words uttered when they said: "The only way to avoid onion breath is to stop eating onions." We agree with the professors, but we wouldn't dare say so.

• *Vimpep Foods, Inc., has introduced a new pet food. Vimpep executives say: "We've developed the food that will develop your dog. There'll be tail wagging for Vimpep in every market. . . . In every pup and tabby taste-test. . . . Vimpep Foods win by everything from a shrill yelp to an ear-splitting meow." It must be good.*

• To promote the sale of beverages in bottles, Owens-Illinois is suggesting that empties be used for party games, such as ringing the bottle neck and dropping clothespins in the bottle. But they overlooked the most thrilling of all—dropping empties from a fifth-story window at 2 a.m.

• *A survey to determine the best voltage for electrical fences for cows shows that five volts impairs Bossy's nerves, seven dries up her milk and thirteen is fatal. How shocking.*

WHO would ever suspect that the Yearbook of the U. S. Department of Agriculture could ever be classified as interesting reading? Let us credit that much to the good deeds of the Roosevelt administration.

In particular we are fascinated by an article that begins on page 184, dealing with the private life of the mule. (Stop us if you are agin' the facts of life.) It seems that mules do actually have children, despite all folklore to the contrary. Ain't nature grand? There is a tale about a mule named Old Beck that had a son named Pat Murphy who was "strong, healthy, amorous—" well, read it yourself.

The New "Mandate"

IF anybody doubted the validity of Mr. Roosevelt's 1933 assertion that he had a "mandate" from the people to depart from the old order that doubt is forever removed.

At this time the supreme test of the President's character will come. How he bears up under the amazing load of political prosperity will control the fate of the nation. It is fortunate that he has had nearly four years of unusual power and popularity to accustom him to the frank adulation of two-thirds of the population.

If he is a truly great man, the greater responsibility he now faces will develop in him humility and wisdom and caution. His greatest danger will come from those close to him who may urge him to acts that are based on the enormous power conferred on him. For, without any opposition worthy of the name to act as a restraint, the President must needs be a superman to resist the promptings of those friends who may read into the latest "mandate" some slightly fantastic interpretations.

For the food industries the election landslide is loaded with many problems. First of all will be the Food and Drug Law revision. What will come out of a Congress that has a "mandate" like this one is a matter of unhappy speculation. On its food control side we may anticipate something a bit more unsatisfactory than the Copeland Bill, S. 5. On the drug control side there is little to concern food manufacturers, except that enforcement of both food and drug control will have many sections in common—particularly control of labels and advertising. The thing to do

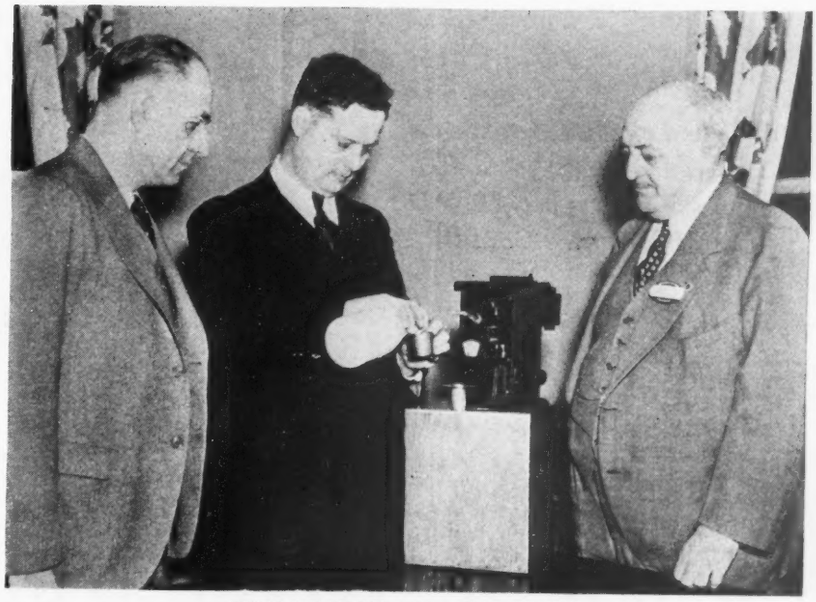
now is to work *for* something—not wait until the industry will be compelled to work *against* something for self preservation.

Industrial relations under the second term of the New Deal are likely to become a crucial problem with many a manufacturer. As a result of the overwhelming victory, labor also may possibly interpret it as a "mandate" to try a few experiments. The "sit down" strike which has already been tried even by school children in Brooklyn, N. Y., as well as in rubber factories in Ohio, may make its appearance in food plants where all is not happy.

If the industry is alert it will do its utmost to find all possible sources of friction and eliminate the cause. If there ever was a time to develop an understanding of the mutual dependency of labor and management, it is now. But if any overtures are made they must be done in a spirit of genuine friendliness. Any sham or phoney schemes will not fool anybody, least of all the working force. Curious tales of recent behavior of workers have trickled into our offices of late and they spell nothing but a changed—almost defiant—psychology.

Good industrial relations cannot be developed over night—nor in a month. They grow slowly—very slowly. Loyalty of employees is a direct measure of the loyalty of the employer to his employees. The initiative must come from the employer. It must be honest, it must be real, it must be consistent and continuous.

For management, the New Deal victory is just as much a "mandate" as for the political Administration of the country. Let every company interpret the trend and act accordingly.



YELLOW MILK NOW THE STYLE

People like yellow milk, and the dairy industry aims to please. A pigment called carotin gives milk the yellowish hue, and dairymen hope to put more of it in the beverage by proper feeding and scientific breeding. To grade milk for color, there has been developed an electric-eye colorimeter or lactochromometer. The deeper the color, the less the light passing through and the higher the reading on the instrument. The device is being demonstrated by Dr. J. W. Bartlett (left) and H. H. Tucker (center), both of Rutgers University, to Henry W. Jeffers, president, Borden-Walker-Gordon Laboratory Co.

The Cost of New Customers

EVERY week in the year sees some food manufacturer making a test campaign with a new food or a new package. Some make a test in a single store, some use a whole town. The broad object of the campaign has usually been to find out if the item can be sold, will it repeat, does the public like it—all purely qualitative information.

Under the most astute of sales managers today, the test campaign is taking a new form. Merchandising is emerging from the qualitative into the quantitative stage. The best laid plans now reveal comparable costs of getting customers for a product by various methods of handling. It is not enough to know merely that a product can be sold.

Just to give you something to bite into, a recent well-planned introductory test campaign revealed differences in average costs of getting customers that varied between 5½ and 85 cents per repeat customer. On a 20-cent item you can see at once that the 85-cent repeat customer would have to buy an awful lot to show the manufacturer a profit.

There is no foretelling how to introduce a new item profitably. Hence the test campaign. But the test must be planned to give exact quantitative information, or else success, as measured by net profits, may be far, far away.

Bonuses on the Wrong Basis

A VERY definite obligation rests on the general management of a company when it places the plant manager's salary on a bonus basis. This obligation is to make sure that enough money is being spent for adequate plant maintenance and replacement of obsolete equipment, also for keeping the plant personnel in proper condition, with replacements coming along.

If the plant is to be kept in first-class condition at all times as a going producing unit, it is important that the bonus basis be so set up that *costs* are really kept down. Too often the bonus is merely a reward for not spending money.

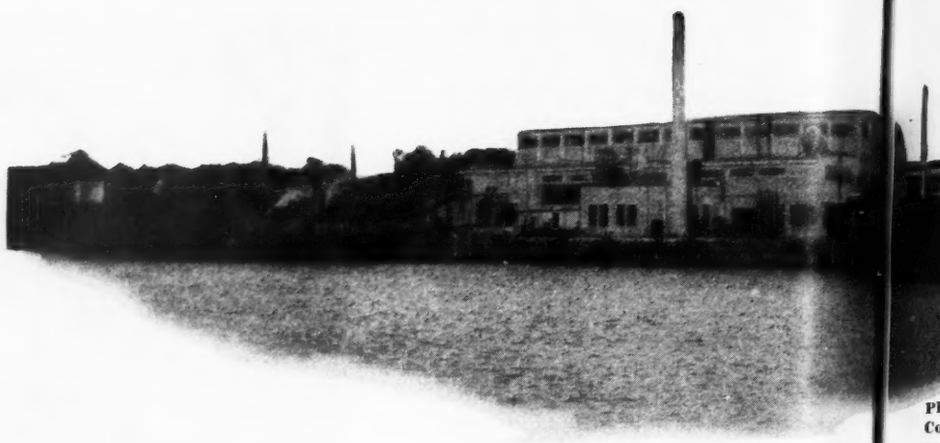
A better basis is a bonus plan that insures wise spending. Low cost production, of proper quality, at a rate that can be profitably sold, is the most desirable condition to be attained. A bonus for not spending can be a good thing—provided that competitors do not get any bright ideas and step out into the lead, and further provided that there are no deaths or resignations from the organization leaving vacancies for which there are no trained men to fill.

An unwise bonus basis can easily become a method that will perpetuate a stand-still policy, if it does not actually put the outfit into reverse.

The Blue Pages Move

LOOK for the "Blue Print Section" next to the back cover. Beginning with the December number it will no longer be found bound into the middle of the publication. This change is made to facilitate make-up and printing, but the page numbers will be in sequence from the last text page in the body of the magazine.

Research Department Solved Problem, Also Discovered That Last 22 Per Cent of Moisture Could Be Removed in Pneumatic Conveying System



When the Dryer Would Not Work

By HARDEN F. TAYLOR
President, The Atlantic Coast Fisheries Co., New York, N. Y.

THIS is a narrative of one of those things which happen in every factory — of a process that fails to work, loss of time, patience and profits, while everybody around the place tries to make it operate—and of the eventual satisfaction that comes when by observation, experiment and analysis the thing is finally understood, the trouble located, and a bit of ingenuity provides the remedy, so that it works.

A fish plant was to be erected—in fact, it was erected—having everything known to science and technology, —speedy and efficient conveyors, sanitary containers, chilled rooms, deodorizers, incinerators for waste, quick-freezing, automatic cellophane packaging machines. The inedible portion of fish—heads, bones and skins—while in the strictly fresh condition were to be disintegrated, vacuum dried and ground into fish meal, and marketed for animal and poultry feeding.

The vacuum drying type of process was recommended by the scientific department, mostly on theoretical grounds, because it was desired to produce the finest possible fish meal. Flame drying was considered bad because it may scorch the product and contaminate it with the flue gases and dusts. Cooking and pressing was disfavored because no oil was to be had from the product, and the watery portion to be pressed out contained not only some protein but valuable mineral salts as well, which should be retained in the meal for the best product. The result sought was the removal of only water at the lowest practicable temperature, leaving all the nutrient solids in the dry product, heated as little as possible and otherwise unaltered. It had been found that heating fish protein, especially in the dry state, impairs its food value.

It seemed that no difficulty in drying in a vacuum need be encountered, for horizontal steam jacketed vacuum dryers were in regular use for just such a process in drying tankage and other wastes in packing houses, and were standard equipment designed and supplied for the purpose. Accordingly, contract was let for two dryer units, and conveyors were arranged to carry continuously the fish residues from the cutting tables to disintegrators and then to the dryers.

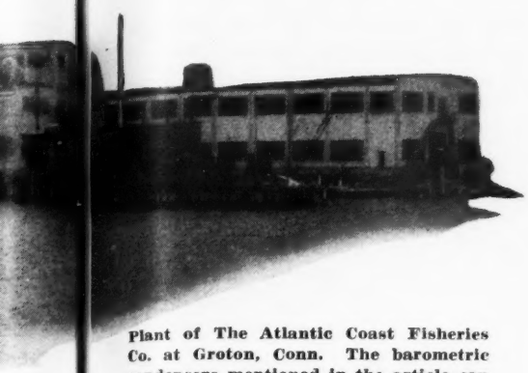
Each dryer was a horizontal cylinder, of boiler plate, steam jacketed except at the ends. It was provided with man-hole for charging, which was closed by a large vacuum-tight gate valve. A run-off pipe fitted with steam trap below carried the condensed water from the steam jacket back to the boiler; a gasketed discharge door was in one end of the cylinder at the bottom for removal of the dried meal.

A heavy horizontal shaft extended axially through the dryer, provided with paddle arm scrapers just clearing the inside surface of the cylinder wall. The center of the shaft was slightly below the true axis of the cylinder, so that clearance of the paddle arms was least at the bottom and most at the top. The paddles themselves, attached at the ends of the arms were flat slabs of boiler plate, arranged radially, the thick edges nearly making contact on the lower

▶This company borrowed an idea from meat packing. Also it bought some vacuum dryers used by meat packers. They wouldn't work. The machine that was successful in a packing house stalled in a fish meal plant. Why a 20-hp. load would stall a 50-hp. motor was a mystery until the research department was called in. And then they not only solved the dryer problem, they improved the drying operation tremendously.

How it was done is something all food manufacturers can profitably consider. The operation, however, is directly useful to

Fish Processors
Meat Packers
All byproduct and waste disposal departments where drying can be employed



Plant of The Atlantic Coast Fisheries Co. at Groton, Conn. The barometric condensers mentioned in the article can be seen at the left of the power plant stack.

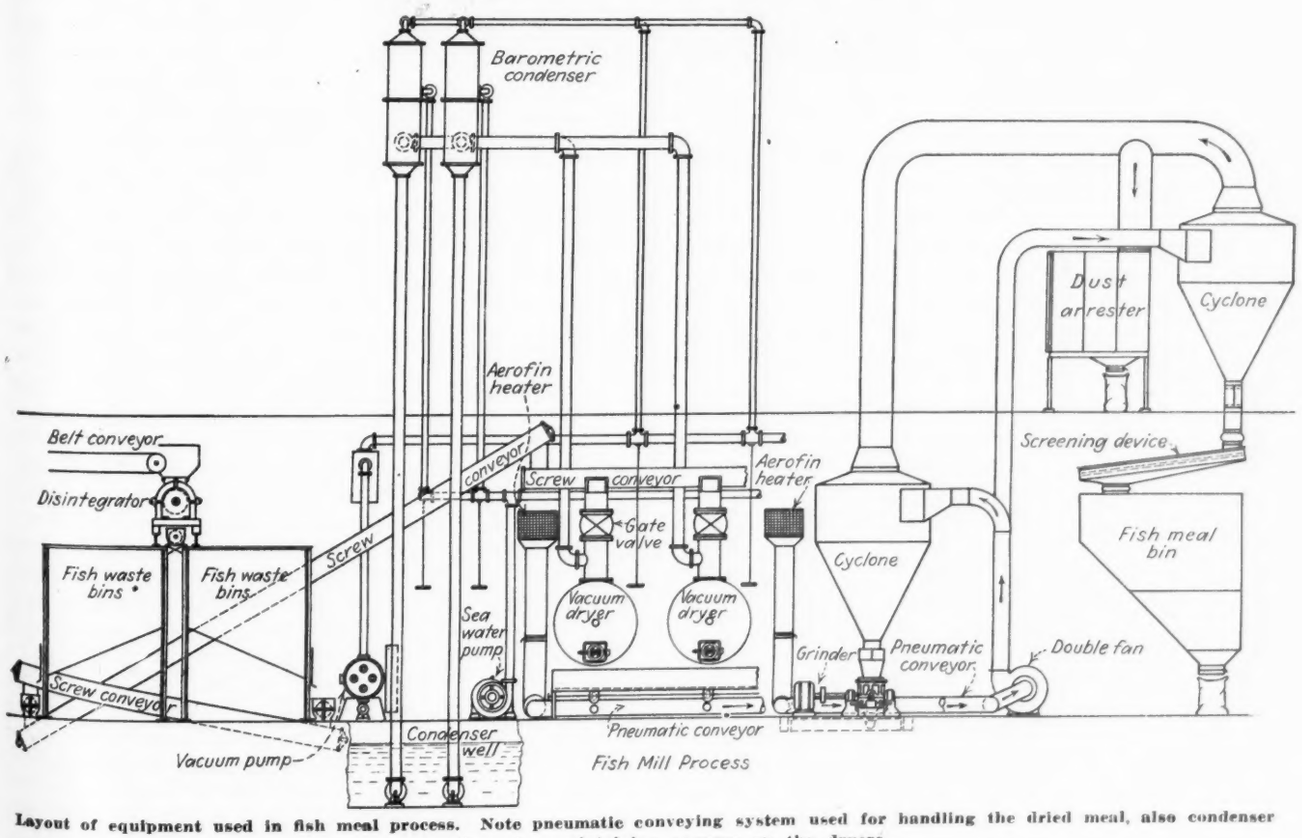
side, as the whole assembly revolved inside the cylinder, driven through a chain of gears from an a.c. induction motor. The bearings were sealed with ample stuffing boxes.

A large cast iron pipe led from the dryer to the vacuum head of a barometric condenser 35 ft. high, outside the building. Sea water was lifted by centrifugal pump to this head, cascading inside in such manner as to condense the water vapor from the dryer and travel down the barometric leg to the condenser well at the foot. Non-condensable gases were removed by a large horizontal reciprocating vacuum pump whose suction line led from the condenser head. The discharge from this pump, laden with fish odors, was chlorinated and led to the stack to be further deodorized by the hot flue gases.

Such, in sketchy outline, was the equipment and the arrangement thereof, after some previous troubles and delays had been experienced in an unsuccessful attempt to employ multiple jet condensers without barometric leg. The equipment arranged as above described, was expected to work. It did not seem to violate any of the laws of nature, nor to run afoul of engineering experience in the art of vacuum drying. But it did not work. For an agonizing time it did not seem that it ever could be made to work, and it cost many thousands of dollars.

What happened was this: The dryer was filled with 8,000 or 9,000 lb. of wet chopped fish waste and the loading gate valve was closed. The steam was turned into the jacket and the motor was started driving the agitator. Centrifugals were set pumping sea water into the vacuum head of the barometric condenser, and the vacuum pump was set going to pump out the non-condensable gas. Water was now evaporating at great rate from the fish waste in the dryer, and the vapors were rushing through the pipes to the condenser head, where they were condensed and carried down by the sea water into the foot well and into the harbor. Everything should soon strike equilibrium, the point of which was determined by the heat input from the steam jacket, the resistance of the pipe lines, and the temperature of the condenser water, on the one hand, while, on the other, the leaks of air into the system were balanced by the operation of the vacuum pump on non-condensables at the condenser head. Equilibrium among all these effects was established, in the early stage of drying, at a vacuum of about 27 in. mercury and a corresponding temperature of about 115 deg. F. in the dryer cylinder, which was as it should have been, and everything was going well, so far.

Within about 1½ hours from the start of the batch, the motor driving the agitator shaft would begin to labor noticeably and the gears begin making a groaning noise. The motor heated to 45 to 50 deg. C.—obviously overloaded. Fuses blew, knockouts broke the electric circuits, the motor was stalled. When the vacuum was broken and the dryer opened the contents were found to be a sticky, pasty



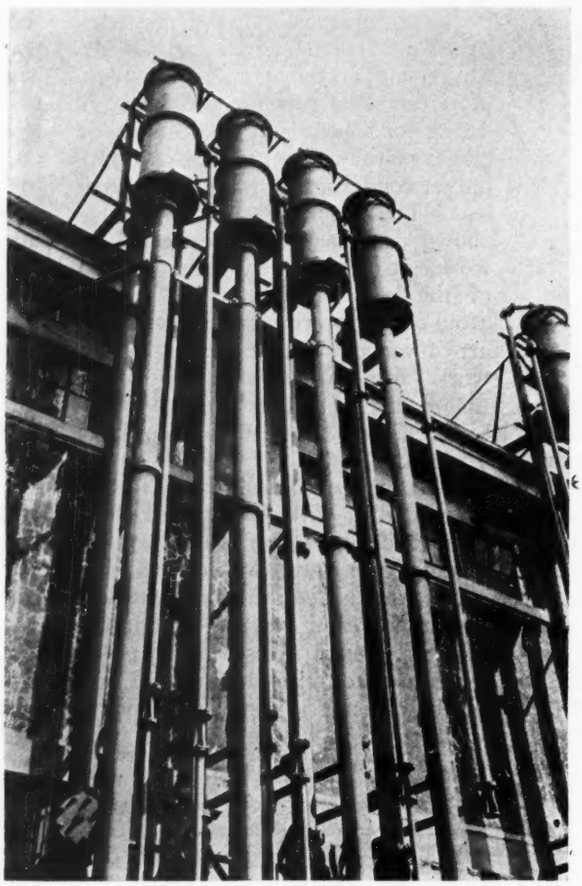
Layout of equipment used in fish meal process. Note pneumatic conveying system used for handling the dried meal, also condenser connections for maintaining vacuum on the dryers.

mass obviously beyond the power of the motor to keep in agitation.

Operations were discontinued while heavier motors were ordered and installed—at first 25 hp., then 40 hp., and still they stalled. When 50 hp. motors were installed the gears were stripped and the shafts were being twisted. Stuffing boxes developed leaks almost immediately after being repacked. All available floor space in the drying room was filled with barrels of half-dried and decomposing fish waste; some of it was taken on a barge out to sea and dumped, and chaos reigned in the plant.

At this stage, study and diagnosis by the research department was ordered.

The procedure was directed to finding out just what happened inside the dryer as drying progressed from wet fish to pasty mass. It was impossible to arrange to see, or to install recording instruments inside the dryer. Resort was therefore had to accurate external measurement of temperature and pressure in the dryer, and of the amperage of the power line. An accurate mercury manometer was attached to the vaccuum gage connection, and the thermometer which measured the temperature of the drying waste was checked for accuracy, so as to be sure that temperature-pressure correlations were correct. An ammeter was connected in the power line to the motor. Vapor-pressure temperature charts for water were prepared and corrected for the estimated salt content of the fish. The dryer was then charged with a small batch of waste and everything set in motion. It operated smoothly, while readings were made, every three or four minutes, of temperature of batch, vapor pressure, and amperage on the power line. The amperage slowly increased, while the pressure followed the temperature curve almost exactly. At the end of an hour and a half the amperage began to rise very rapidly and the motor labored almost as much as it had done before on full loads. It was obvious that the doughy consistency in the waste was a condition approached slowly with steadily rising load on the motor, and then more rapidly rising to a critical peak of tough consistency that stalled the motor. It began to be clear why equipment in regular use in packing houses did not operate satisfactorily on fish. Packing house waste is greasy, and does not stick to the inner walls of the dryer, while cod and haddock have no oil but much glue, so that a sticky mass is formed which is very tough and doughy during the middle stage of drying.



Barometric condensers used to condense the vapors from the fish meal dryers. Multiple jet condensers without barometric legs were tried first, but it took the condensers shown here to maintain a 27 in. vacuum on the dryers.

Here unexpected but important events were observed. As the motor began to labor and the amperage on the line rose sharply, but with the vacuum pumps and condenser water running and steam in the jacket, if the vacuum was broken by the opening of a 2-in. valve in the dryer, so that air was sucked in, the amperage instantly dropped, laboring of the motor ceased and everything ran smoothly again. Of course, the vacuum went down, the temperature went up, but the temperature no longer corresponded to the boiling point curve. Now if the vacuum-breaking valve was again closed, the vacuum was rapidly built up again. With one observer's eye on the gage and thermometer and another observer reporting the ammeter, it was found that as soon as the vacuum went up to the point corresponding to the boiling point of the water at the temperature of the waste, the ammeter began to climb rapidly. Break the vacuum again and down went the ammeter and laboring of the motor ceased. This was done repeatedly, always with the same result. It was clear that some relation existed between vacuum, temperature and the load on the motor. In what way could a vacuum overload the motor, and why did the overloading correspond approximately to the boiling point of water at the prevailing pressure?

With these data in hand, it was necessary to set up a hypothesis of what was happening inside, and then, if possible, check the hypothesis—a common procedure in scientific method.

The reasoning followed in setting up this hypothesis was based on the well known laws of vapors. At any given pressure (or vacuum) water has a definite boiling point. At atmospheric pressure (14.7 lb. per sq. in.) the boiling point is 212 deg. F. At 27 in. vacuum it is 115 deg. F.; at 28 in. vacuum it is 101 deg. F., and at 29 in. it is 79 deg. F. Water cannot ordinarily exist in liquid form under any given pressure at a higher temperature than its boiling point at that pressure. Now, it could be safely assumed that when the system is operating under vacuum the body of the fish mass is at the boiling point of the contained water. But is the temperature throughout the mass uniform or is any place in the dryer hotter than another? If any place is hotter than another, boiling will occur at that place in preference to the cooler places. Obviously, since heat enters the dryer from the steam jacket, and only from it, the layer of waste in contact with the shell of the dryer must be hottest. Accordingly it is there that water evaporates and drying occurs. The remaining

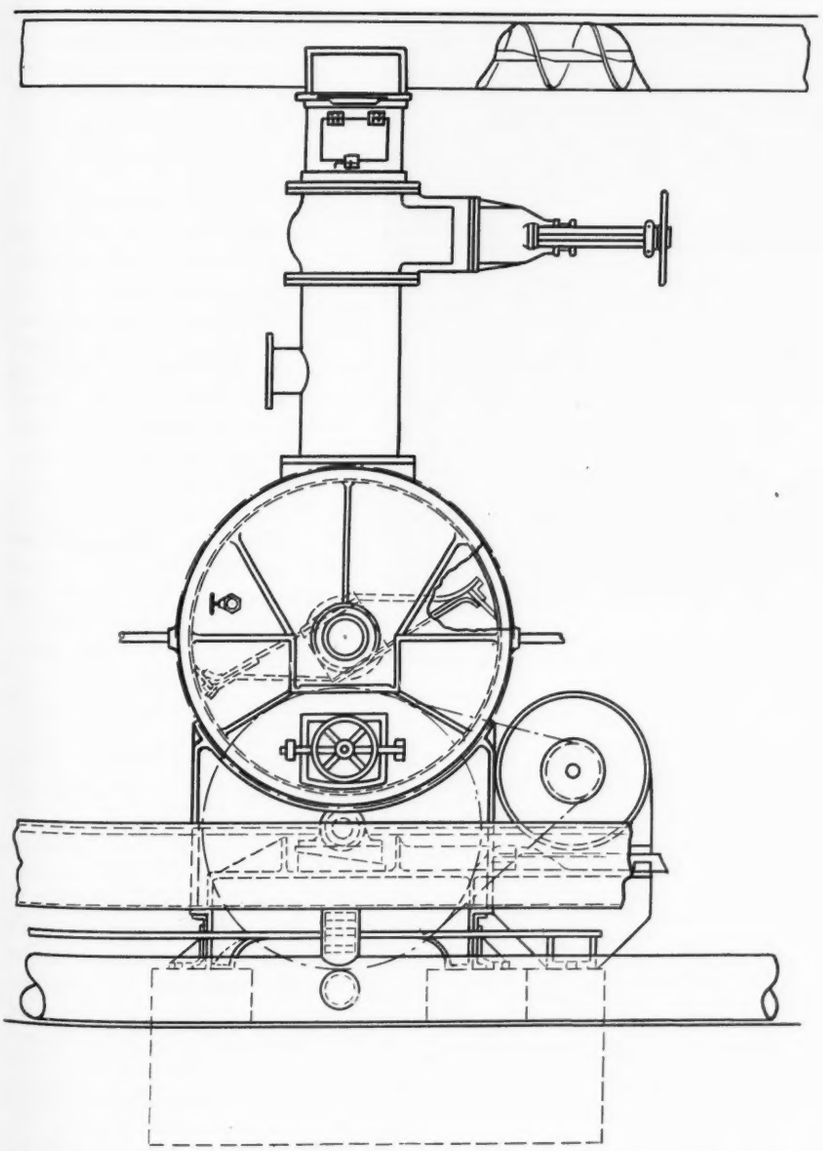
mass cannot receive heat and therefore cannot dry, because the heat can enter the mass only through the layer in contact with the steam jacket. In this layer the heat is absorbed in evaporating the water in the layer. A layer of pasty fish is thus plastered and dried into a hard cake against the shell of the dryer. Between passages of successive paddle blades this cake increases in thickness and has to be scraped off by the paddles. The increasing load on the motor is caused by the increasing toughness of the mass of fish to be moved plus the heavy duty of scraping the cake away from the walls.

Now when the vacuum is broken, or partly so, and air sweeps through the dryer, the pressure rises (or vacuum goes down). The drying now occurs, not on the wall of the dryer as before, but on the surfaces of the mass up in the center of the dryer, and on the paddle blades, wherever the air strikes it, as if air were being blown over the surface of a hot liquid.

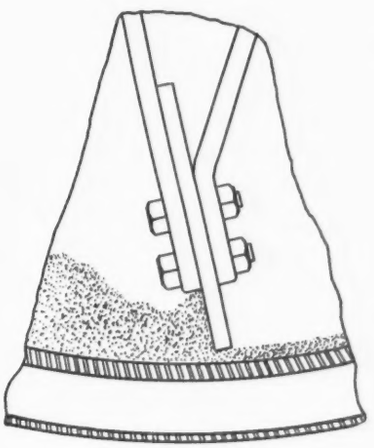
In this case, the paddles continually bring different parts of the mass in contact with the hot surfaces; they remain in contact and are being heated until the following paddles wipe them off and apply other parts of the mass. The heated paste is thus being continually warmed and mixed, the heat being carried throughout the mass by the mechanical action of the paddles. The contents never reach the boiling point, because the breeze of air blowing over the surfaces removes heat by evaporation of water as rapidly as heat enters through the walls of the dryer.

This hypothesis, if confirmed, would explain why the motor labors with vacuum on, and is relieved when the vacuum is broken. If the hypothesis were true, certain consequences must also be true, and these could be checked. If, in accordance with the hypothesis, the cake is continuously being formed on the wall when the operation is under high vacuum, it must form more rapidly on the lower half of the cylinder than on the upper because the mass of fish lies mostly in the lower half. Also, since the shaft is located slightly below the central axis of the cylinder, the clearance of the arms is less on the bottom than on the top. Consequently, the heavy labor on the motor must occur as the successive paddles pass over the lower half of the cylinder. If, in turn, this is true, then the ammeter needle should not remain steady but should show a steady swinging motion, four swings to each revolution of the shaft, since there were

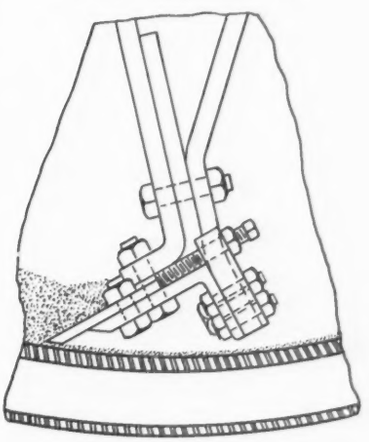
(*Turn to page 651*)



Standard packing plant tankage vacuum dryer, installed with screw conveyor for feeding raw fish waste, and pneumatic conveyor for handling dried meal. Note the redesigned paddle blades used for moving the meal through the dryer.



Original Design
Paddle Arm Scrapers



Improved Design
Paddle Arm with Cutting Blades

The original and redesigned paddle arms and scraping blades in the fish meal dryer.

Freezing Makes Rapid Progress Borrows Ideas From Canning

BY H. J. HUMPHREY

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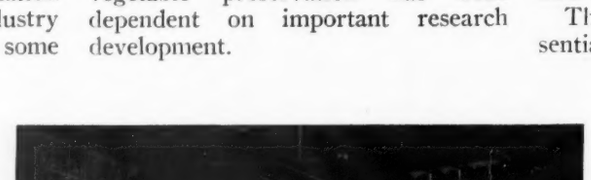
IT is inevitable that the new freezing industry will be closely associated with canning. The existing technical and practical knowledge regarding the growing and preparing of fruits and vegetables for canning forms a splendid foundation on which to build this new industry and undoubtedly accounts, to some extent at least, for its growth to the present time.

The freezing preservation of fruits and vegetables may be essentially classified into two groups according to the general methods of freezing used — namely, slow freezing, originally known as cold packing, and quick freezing.

Cold packing, which had its beginning about 1908, has been commercially used largely on fruits. Between 60,000,000 and 65,000,000 lb. of frozen fruits were cold packed in 1935. In cold packing, the freezing is done by placing the products in containers in a very cold room or sharp freezer where the temperature is maintained at from 15 above to 20 degrees below zero Farenheit. Perhaps it is significant that the tendency in slow freezing is toward the use of packages progressively smaller in size in order to reduce the freezing time.

Quick freezing, as the term implies, is very rapid freezing of the product and was first commercially used for fruits and vegetables in 1929 and 1930. Since then the development of the industry has been fairly rapid although the extent of the development is not generally known. Pack statistics have not been published. However, it has been recently estimated that the total quantity of vegetables quick frozen in 1935 totaled approximately 16,000,000 lb.[4] The development of quick freezing as a commercial method of fruit and vegetable preservation has been dependent on important research development.



Portable Birdseye multi-plate freezer, as used for freezing vegetables, fruits and other foods, directly at the point of origin.

Quick vs. Slow Freezing. The principal advantage of quick freezing over slow freezing has been summarized by Tressler[4] in the following three ways:

(1) The ice crystals formed are much smaller and, therefore, cause much less damage to the cells.

(2) The freezing period being much shorter, less time is allowed for the diffusion of salts and the separation of water in the form of ice.

(3) The product is quickly cooled below the temperature at which bacterial, mold, and yeast growth occur, thus preventing decomposition during freezing.

Quick Freezing Methods. There are a number of methods that may be employed for quick freezing fruit and vegetables.

The Birdseye method consists essentially of freezing the product in packages under controlled pressure between two refrigerated metal plates. The "Z" method makes use of a refrigerated brine spray or fog. Usually the brine is sodium chloride cooled to the maximum possible, minus 3 deg. F. The Murphy system consists of freezing by contact with refrigerated metal surfaces on the under side of the package or product and cold air circulated over the upper side. Air blast freezing is accomplished, as the name implies, by the use of rapidly moving cold air in an enclosed space.

Varieties Adapted to Freezing. United States Department of Agriculture workers, by means of extensive studies, have made valuable contributions in the matter of varieties of fruits and vegetables best adapted to quick freezing.[6] Others have added much valuable information on this subject.

It was early found that varieties suitable for canning or cold packing were not likewise suitable for quick freezing. For canning, peas are used that are light in color and that run to comparatively small sizes. For freezing, it was found that varieties with a darker color and running to larger sizes resulted in better quality. Varieties grown for shipment to market were found to be quite suitable for freezing purposes. Some varieties of peaches were found to discolor more rapidly and to a greater extent than

Part of a paper read at the fall meeting of the American Chemical Society, Pittsburgh, September 1936. The full title was "The Preservation of Fruits and Vegetables by Canning and Freezing," it being a part of the symposium on Food Processing and Preservation.

others, but several varieties have been recommended; whereas in the case of red raspberries, the Cuthbert is the only variety that has been found suitable.

While much work has been done on varieties for freezing, it is felt that much remains to be done—particularly in improving strains to secure better quality, more even maturity, and greater yields from the crop.

Enzymes. Enzymes are probably present in varying amounts in all fruits and vegetables. Investigations carried on in 1928 and 1929 first indicated the necessity of inactivating the enzymes preparatory to freezing. This is accomplished in the case of vegetables by the use of heat and, in the case of fruits, by the use of sugar or sugar syrup. It may be said that the inactivation in the case of vegetables so far is probably more successful than in the case of fruits.

If not inactivated, the enzymes will cause changes during storage, seriously affecting the quality of the product through the loss of flavor, the development of off-flavors and odors, often referred to as "hay like," and by causing the fading of the color of the product.

The heating of vegetables by steam or hot water is commonly known as blanching. Some of the first attempts to freeze vegetables failed because blanching was not used in the preparation. Much work has been done and there is yet much to be done regarding proper blanching procedures. The refinement of methods for determining the enzyme, catalase, has aided materially in determining times and temperatures for blanching.

There has been a definite indication in the work so far carried on that the lower the storage temperature, the less the activity of the enzymes. This is particularly important with regard to fruits.

Bacterial Growth. Prior to 1932 there was but a limited amount of work done on the bacteriology of frozen fruits and vegetables. Since then a number of investigators have worked on this problem.

In these few years of quick freezing development, scientists have raised the question of public health being endangered by frozen vegetables. It has now been established that if frozen vegetables are held under proper refrigeration there will not be any development of toxins. Further, it was found practically impossible for Botulism to occur through the use of frozen vegetables as in all cases conditions required for the development of the toxin resulted in the product's being considerably decomposed and quite inedible.[5]

Investigations so far indicate that quick freezing reduces the number of living bacteria with further decreases occurring during storage. These reductions are more rapid in acid than neutral or in slightly alkaline products. Some investigators state that the reduction usually amounts to about 90 per cent after a year's storage. Apparently there is yet some uncertainty on this point.

Quality. The quality of quick frozen fruits and vegetables has been outstanding. Probably more than 95 per cent of the production has been of a very fancy quality which has been quickly appreciated by the consumer who is usually extremely critical of new products. It is the hope of those interested in this industry that this high standard of quality will be maintained. Undoubtedly it will have a direct influence on the future of food distribution.

As one has said, frozen fruits and vegetables are more "fresh" than fresh produce itself.[7] This seems reasonable when you consider the maturity required for shipment in the fresh state and the natural processes that continue during the time of shipment and handling. Commercial lots of some products harvested for shipment have been quick frozen with a resulting lower quality when compared with a corresponding pack from crops grown and harvested for quick freezing. Crops for both freezing and canning are harvested at just the right stage of maturity and quickly handled until processed.

Not all fruits and vegetables can be frozen satisfactorily. A notable exception is tomatoes. The particularly desirable products now include peas, sweet corn, lima beans, broccoli, string beans, spinach, asparagus, squash, carrots, cauliflower, strawberries, raspberries, blueberries, cherries, and peaches.

Other Problems. Much work has been done and much accomplished on other problems of the industry but time will permit only a brief mention of some of them.

What containers are best suited to frozen products, having in mind particularly the influence of the package on the rate of freezing and on the prevention of undesirable drying during storage? There are storage problems and particularly those having to do with the temperature required in the warehouse and in the retail store case are important.

The development of mobile freezing equipment is aiding production. The development of suitable retail store cases manufactured at lower costs is aiding distribution.

What methods should be used for preparing frozen foods for the table and how can this information be put before the consumer? And most important of all are the many problems of distribution, for upon the proper solution of them will depend the future of this new industry.

FROZEN FOODS IN 1935

Frozen fruits led frozen vegetables in volume.

Exact figures are not available, but the following figures are an estimate of 1935 production:

Frozen Fruits . . . . 60,000,000 lb.
Frozen Vegetables 16,000,000 lb.

Total Production . 76,000,000 lb.

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Wasted Labor Dollars

You will be surprised when you read this article. But you will get from it an idea which may save you money.

By S. A. WEART
McDonald Brothers, Inc., Boston, Mass.

MILLIONS of dollars are wasted each year by the nation's meat packing plants in the form of payment to workers for services not rendered. And this in an industry which has prided itself, and done so justly, upon its efficiency in saving every part of its raw material, even to the grease in the wash water.

There are, to be sure, notable exceptions among the packers, both large and small. But the industry as a whole does not control the labor dollar to best advantage. This charge is not pulled out of thin air. It is founded upon detailed studies of conditions in more than a dozen packing-houses located in many different states —companies which in general have excellent earnings records.

Five typical plants for which full information was available were studied thoroughly. And labor standards were set up from the information obtained by means of detailed observations with the stop-watch. All local differences in regard to plant layout, labor rates and working conditions in general were taken into account.

WITH the aid of yardsticks made in this manner, some surprising, if not shocking, things were found out about costs. During the first week that figures on actual labor costs were placed side by side with those determined as the standard, all five of the packing plants were shown up. They were found to be using considerably more labor than was needed. The precise amount is shown clearly in Fig. 1. Even the best plant had too high a labor cost by 4.8 per cent, meaning that it was throwing away nearly $1 for every $20 which it spent for work actually done. But that was nothing. The worst plant of the lot was running a labor bill which was too high by 27.5 per cent. That is to say that for every $100 which it should have spent, it was tossing $27.50, a week's pay for some men,

▶How five meat packing plants saved 13.4 per cent on labor costs in four months involves a principle that is important to all food manufacturers. They found out what was a good average day's production measured in terms of man-hours. Then they told each foreman how the work of his group compared with the standard for a good day's work. They gave him this data every day. And soon costs began to go down. How it worked out shoud be understood by

All Food Manufacturers

out the window. The packer which represented the average between these extremes was paying $15.50 for services not rendered for every $100 he paid out for work accomplished.

The amount of waste represented by these figures seems pretty high. And one might be inclined to believe that the waste was not that great, were it not for one thing. That one thing is the fact that each of these plants later reduced its labor costs by at least the amounts cited above as the unnecessary expenses. And they did this without in any way lowering labor standards. More will be said about that later.

In setting up the labor-cost standards, the separate departments of the plants, of course, were studied. There were 125 of these departments, and something less than one fourth of that number, 23.2 per cent to be exact, were operating at or near the efficiency that they should (see Table I). Another 23.2 per cent of them, or 29 departments, were running from 5 to 10 per cent above par in labor costs. But the others were not so good, with one having a payroll 65 per cent too high. And on the basis that the average department has too much labor by 15.5 per cent, thirteen out of every 100 men in these departments could be put to other work about the plant without at all cutting production and with no damage to quality or yield in their departments.

It might be thought that the laborers working in gangs would make the best showing, because every man must keep up his end of the job. But this is true only of beef operations. Hog killing gangs were invariably operated at either uneconomical speeds or

While the means of reducing labor costs discussed in this article were worked out for meat packing plants —

with unbalanced forces. This shows up in Table II, which lists the amount of labor wasted in fifteen principal types of packinghouse departments. In the hog killing departments of the five plants covered, the amount of labor required was too high by 15.4 per cent. While looking at Table II, it is interesting to note that the so-called manufacturing departments are near the bottom in relative efficiency. These departments include ham boiling, bacon slicing (the operation done by attractive girls in neat uniforms), smokehouse operation and similar work. And, despite the fact that they have to keep up with the cutting floor, the pork trimming and packing operations also make a poor showing.

Here is a significant truth which was brought to light by the time studies in the various departments of the packing plants. Where tried standards of performance, even though rough, were in the mind of a capable foreman, the department in general was well operated. Typical examples of this are the beef killing and hide-cellar work. In both cases, the time required for various operations is almost a matter of trade practice.

Now what is the reason that labor is wasted in meat packing plants? The involved and rapidly changing operating conditions cannot be held responsible. That is no alibi for either the foreman or his superiors. The weakness lies solely in a lack of information. The foreman has no real knowledge of what is expected, no usable record of what has been accomplished. One of the curses of the packing industry is the out-of-date system of "tests" for determining labor and other costs by product classes. But even worse is the widespread use of over-all unit costs to gage changes in efficiency from one period to another.

If there were no changes whatever in the relative amounts of products handled, over-all unit costs would be valuable guides to management. But it is obvious that such is rarely, almost never, the case in packinghouse operation. If more lard is sold in 1-lb. cartons this month than last, the cost of packaging lard per hundredweight rises. And the foreman of the lard packaging department has an explanation as to why. But no one really knows whether the full amount of the increase is justified. It frequently happens that a rise in the over-all cost per hundredweight in some department may really be accompanied by a gain in efficiency.

And on the other hand, a labor cost which does not vary from month to month does not necessarily mean that a department is well supervised. Take the manufacture of sausage. There, an increase in the amount of the heavier types produced will reduce the amount of labor required, and this will cover up a laxity in supervision and prevent labor costs from rising. In such a case, the foreman, the superintendent, the president —no one—knows the true facts. They cannot know them under the usual practices of the industry without going into long, special studies of operations. And such studies are too complicated to be made often, or to be completed soon enough to prevent the figures obtained from being anything more than historical data.

This much may be said about supervisory conditions in the average plant. If the management has little real knowledge of the operating efficiency of the factory as a whole, the foreman has poor chance to locate the spots where costs are excessive in his own little business, the department which he supervises.

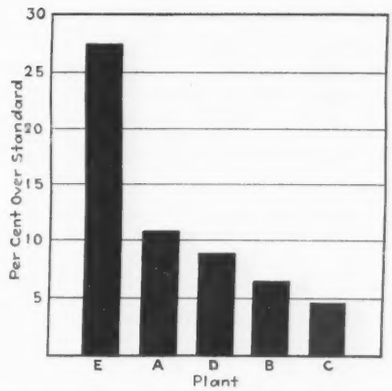


Fig. 1—Inefficiency found in five different plants, all departments being taken into consideration.

It is one of the accepted rules of management that managerial efforts are most effective when applied to exceptions to routine—to the operations which are out of line. But if a foreman has no definite information as to what operations are costing too much, how can he concentrate his efforts upon reducing the cost of those operations?

THE way to reduce labor costs, then, is to furnish both the management and the foremen with information which will show what operations are out of line. And this data should be supplied soon enough to be of use in preventing further waste. The mechanism for doing this need not be very complicated. As to the cost, an expenditure of $8,000 a year for additional time-study and clerical work will place under control 1,000 employees in the average plant.

The basic methods by which the necessary information is obtained are merely those of standard costs. The first thing to do is to set up a labor standard for each operation performed. This should show the number of man-hours required to perform the operation, a standard rate per hour and a standard cost for the job. These standards ought to be based as fas as possible on time studies made with a stop-watch.

The packer may be surprised to find that because of the repeating nature of most packinghouse work, only a small number of standards are needed. This is not true in many other industries in which standard costs have been used successfully for a number of years.

—The methods that have enabled the packer to reduce the amount of wasted labor can be applied in other types of factories.

After standards have been determined, a "standard sheet" should be prepared. This is to be given to the foreman, and it should describe fully the scope of the operation with which he is concerned. This, then, serves as a guide to the foreman in distributing work to his gangs.

In checking operations against the standards, the man-hours actually put in each day by the workers should be allocated as far as is practical against the individual standards, and the number of man-hours spent ought to be compared with a rough approximation of the amount that should have been spent. To obtain the latter figure, all one has to do is divide the amount of material put through the operation by the amount that should be produced per man-hour, as shown on the standard sheet. Each day, then, the foreman knows on which operations he has fallen down, and he can set about improving on these the next day.

At the end of each weekly payroll period, the standard labor cost for the department is calculated. This is done by multiplying the amount produced under each operation by the standard cost per unit of production for that operation. Then this standard payroll is compared with the actual payroll and the difference determined both in dollars and in percentage. Red ink, of course, is recommended for those labor cost figures which are above the standard. This red ink has a psychological influence. And with any pressure at all from their superiors, foremen will show a keen interest in keeping it off the records for their departments.

Then by summarizing the cost reports from the various individual departments, a guide to plant management can be obtained. This enables the superintendent to concentrate his attention on those departments which are too far out of line.

But the weekly reports are not all. The standard labor payroll for each operation in the department is computed at the end of each monthly or other accounting period. Then this is compared with the actual labor payroll and a summary report for management again compiled. The true purpose of the monthly reports is to furnish a basis for figuring highly accurate unit labor costs by products. Unit labor costs which tie in to the cent with the accounting department's figures do away with the need for any "test" costs whatsoever. And they can easily be extended into a complete cost system, including direct material and overhead.

While the complete explanation of the determination of the product costs is beyond the scope of this article, it may be well to mention that the routines follow regular accounting practices, as does the labor-control system in its entirety.

That a simple labor-cost control system of this type will accomplish much in the way of reduced expenses is shown in Fig. 2. There is a typical record of an originally high-cost department after being placed under day-to-day control. And once costs have been lowered by this method, they rarely go very much above the standard. If for any reason they should tend to skyrocket, the increase is nipped short before it becomes excessive. An example of this is seen in Fig. 2, in the 37th week of operation of the department concerned.

NOR does it take long to reduce costs after the system has been applied. More than half of the 125 departments of the packing plants studied brought costs down to the standard figure within the first month after being placed under control. And within three months, nearly 90 per cent of the departments were making par. This is shown in Table III.

But with this system, as with anything else of that nature, its success in the various plants depends rather largely upon the backing given it by the management. A wholehearted desire for improvement soon travels down the line to the foreman or subforeman, who actually puts the system to work. The average time required to bring operations into line with the standard costs in the five plants covered is shown in Table IV. It varies all the way from 6 to 32 weeks, the average being 17. And the payroll of these five plants showed an average reduction from 115.5 to 100.0, a drop of some 13.4 per cent, within four months. Translate this into terms of dollars saved in a payroll the size of that of the average plant, and the amount is worth thinking about.

Table I — Inefficiency Found in 125 Departments

Per cent of actual payroll above standard, first week	*No. of Departments*	*Percentage of total*
0– 5	29	23.2
5–10	29	23.2
10–15	17	13.6
15–20	15	12.0
20–30	15	12.0
30–40	9	7.2
40–50	8	6.4
50–65	3	2.4
Total	125	100.0

Table II — Inefficiency Found in Various Departments

Department and No. of plants	*Per cent of actual payroll above standard, first week*
Beef killing (5)	0.1
Box Shop (3)	2.5
Hide Cellar (4)	4.6
Inedible Rendering (2)	7.1
Hog Cutting (5)	7.2
Oleo (3)	12.3
Lard Refinery (5)	14.5
Sweet Pickle (2)	15.3
Hog Killing (5)	15.4
Sausage (4)	15.6
Pork Trimming (5)	17.5
Sliced Bacon (5)	19.3
Pork Packing (5)	21.8
Smoked Meats (4)	27.5
Cooked Hams (4)	31.0

Table III — Percentages of 125 Departments Attaining Standard in Various Months After Being Placed Under Control

Month	*Percentage*
1st	54.8
2d	23.8
3d	10.7
4th	2.4
5th	2.4
6th	4.8
Over six months	1.1
Total	100.0

Table IV — Time Required for Total Payroll to Attain Standard in Different Plants

Plant	*No. weeks*
C	6
B	14
D	16
E	16
A	32
Average	17

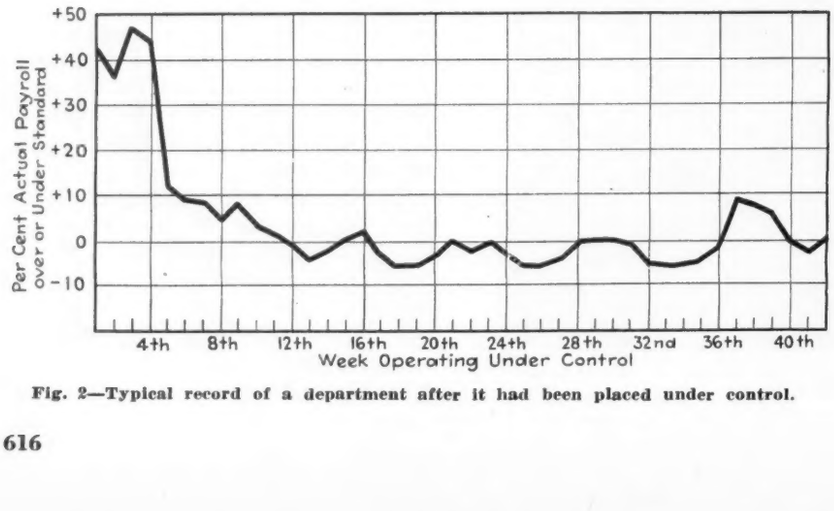


Fig. 2—Typical record of a department after it had been placed under control.

Does Babassu Oil Menace Butter?

Increases In Imports of This Vegetable Oil Not Likely to Continue, as Brazil, the Sole Source, Has Restricted Supplies Available for Export.

▶ ***Dairy interests have worried over recent increases in the importation of babassu kernels and oil. This worry seems premature, as time will be required before Brazil can make much more of the raw material available. Meanwhile, what does enter the United States will provide a raw material comparable to coconut oil, which will be watched with interest by***

Butter Makers
Margarine Makers
Meat Packers
Vegetable Oil Producers
Vegetable Shortening Makers

STRONG PROTESTS by the dairy industry have accompanied the increased imports of babassu nuts and babassu oil into the United States. Babassu started coming into this country a few years ago. Demand for it was gradually built up. It is almost identical with coconut and palm kernel oils and can be used interchangeably with them.

The tariff law and the revenue acts of 1934 and 1936, taxing coconut and palm kernel oils heavily, have sent manufacturers scouting around for new raw materials outside the area of heavy taxation. The recent reciprocal trade treaty signed by Brazil and this country provides for the entrance of babassu nuts and babassu oil free of duty. And furthermore, the United States guarantees babassu against the imposition of any federal excise tax. Thus, with these numerous factors working together, the demand for the oil has been clinched.

Are the fears of the dairy industry justified? The day is saved for United States dairy people by this simple fact: *Nowhere near the amount of babassu oil that would be necessary to put it on a par with coconut oil in volume of consumption is available.*

Judging from imports into the United States so far this year (see Table I), it is estimated that 40,000,000 lb. will be imported in 1936. Compare this with an annual consumption of almost 600,000,000 lb. of coconut oil and about 200,000,000 lb. of palm kernel oil.

Conditions in the areas where babassu oil is produced make it unlikely that quantities much exceeding present imports will be brought into the United States in the near future. This is not because of lack of attempts to produce more. Quite the contrary. Many costly efforts have been made, but with little success.

Babassu oil is obtained from the kernels of nuts produced by the babassu palm, which grows wild by the million in Brazil, mainly in the states of Maranhao and Piauhy. These are jungle regions, where the climate is such that only native labor can be used. And this labor is scarce, costly and unreliable.

Transportation is another bar in the way of producing the oil in large quantities. The jungle is dense and growth is so rapid that roads are kept open only with great expense and labor.

Difficulties beyond those of labor and transportation must be overcome. The kernels, containing 65 per cent of oil, grow four to six in each nut, and the nuts are produced in bunches of 200 to 600 nuts per tree, each tree bearing two such bunches annually. The nuts are so hard that the kernels can only be removed with great difficulty. Until recently, this work was all hand labor, done by natives using handaxes. A machine said to be satisfactory for the purpose was developed in the United States about six years ago. Now the kernels are brought to this country and the oil extracted here, where formerly all this work was done in Brazil. The result is a cleaner, better grade of oil.

While this machine has lessened one of the difficulties in the way of large production of babassu oil, it may not change the situation greatly. Brazil is determined to keep the development of the babassu industry at home. Hence decrees have been issued forbidding the exportation of babassu trees and whole nuts. And there are no known supplies outside of Brazil.

Crude babassu oil is light amber in color. It is obtained by either grinding the kernel, heating and then pressing in a hydraulic press; or by solvent extraction.

This crude oil is used as a soap material, a lubricating oil, and as a fuel for diesel engines.

Babassu oil can be refined and used without further treatment as a food. The refined oil is a solid fat at room temperatures, and thus can

(*Turn to page 653*)

Table II—Exports of Babassu Nuts From Brazil to European Markets in Tons.

Year	Germany	Denmark	Great Britain	Holland	Belgium	Total
1922	14,595	1,546	429	5,213	169	21,958
1923	26,141	6,266	635	865	714	35,281
1924	15,201	1,517	2	527	952	18,314
1925	6,847	238	—	3,522	102	10,909
1926	12,320	2,416	148	6,911	711	22,687
1927	15,415	1,015	266	5,060	637	25,977
1928	—	—	—	—	—	19,266
1929	—	—	—	—	—	8,700
1930	7,125	1,921	154	1,014	202	12,296
1931	5,080	1,781	155	4,587	—	14,213
1932	3,058	1,468	102	2,680	—	8,917
1933	202	—	—	221	200	623
1934	115	—	51	—	50	217
1935	—	—	—	—	—	9,966

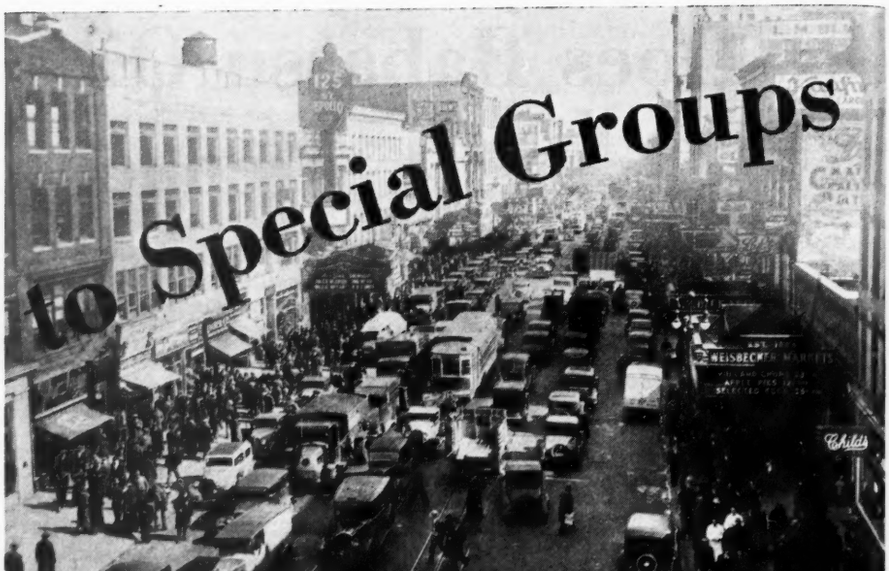
Table I—Imports of Babassu Kernels and Oil, Port of New York, 1936
(000 omitted)

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.
Kernels, Bags	5	38	29	12	10	20	7	33	15	7
Equivalent Oil, lb.	422.5	3,211.0	2,450.5	1,014.0	845.0	1,690.0	591.5	2,788.5	1,267.5	591.5

Effective Selling to Special Groups

Successful methods of approach to the urban Negro consumer indicate how to reach racial or other specific markets

By **PAUL K. EDWARDS,**
Martinsville, Ohio.



Underwood & Underwood

The largest special group shopping center in the United States, 125th Street in New York City, where 250,000 urban Negroes come for food, clothing and recreation.

DECISIVE change has marked the character of the general market during the years beginning with the close of the post war boom. Most of our great industries have reached full maturity. The domestic market has been thoroughly exploited, in so far as extensive marketing is concerned. And the international market, to which productive capacity had become adjusted wherever possible, has been gradually cut off by a growing wave of world nationalism that may endure for a long time. Territorially, the market has been actually shrinking.

This trend of events seems naturally to call for a more diligent, intensive cultivation of the domestic market. Those responsible for sales must dig more deeply for customers at home. Sales programs must be fitted more closely to the peculiar needs of specific areas, racial groups, and even occupational and residence units.

As yet, however, this changed status of affairs has had but slight influence on the selling technics of the great majority of large business enterprises. Such concerns are still almost wholly adjusted and committed to the extensive, mass approach — the so-called American method. This is on the belief that low costs of total market coverage must mean relatively inexpensive selling.

A broad, generalized sales procedure of this type is fully justified so long as the market responds promptly and profitably. This method reaches the largest possible part of the market at one sweep. But when the market has become stationary, or is even shrinking geographically, it is inadequate. The manufacturer, if he is to be successful in a highly competitive market, must find new and more effective ways of reaching it. He needs methods that produce lasting good will.

It is my conviction that methods of market promotion adapted to the characteristics of particular social groups may produce greater and more lasting patronage than appeals addressed to the market as a whole.

I believe that we are now too little aware of the advantage that may come from promotional and sales efforts aimed directly at specific consumer groups in the broad market. I hold that, in spite of a growth in uniformity of consumers, one group will differ far more from another than many have believed. Small but important differences persist in buying habits, customs, tastes and psychological reactions.

It is reasonable to believe that more secure good will can be gained by adopting, along with mass selling tactics, some procedure designed to meet these slight but persistent group differences. Herein probably lies a partial answer, at least, to the all important problem of gaining more effectual contact with the ultimate consumer and reducing the great and continual costs of securing and retaining sales.

Such specialized promotional and sales procedures should be undertaken only when the particular groups concerned actually or potentially present an important demand for the products or services to be sold. Also, there should be a fair promise of results that would justify the costs involved in carrying out the procedures.

The Urban Negro Market

Let us consider the market among city dwelling Negroes in the light of the above ideas. In the first place, these 5,500,000 people present an im-

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► ***In the November number of FOOD INDUSTRIES, Mr. Edwards outlined the Negro market for food products, pointing out its size, distribution between city and country, and preferences as to quality. In this article, he indicates methods that build good will in this market and, by inference, will succeed with other special groups, a selling technic important to***

All Food Manufacturers

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portant actual or potential demand for numerous items in more than one field of consumption. Among the most important of these fields are foods and those articles of a conspicuous character which bear directly upon social position. In the field of foods, the urban Negro home is a very large consumer of flour, baking powder, meats, fats and canned milk. And with respect to this demand, as was indicated in the article "Negro Market Merits More Attention" in FOOD INDUSTRIES for November, 1936, there is a persistent urge in the urban Negro neighborhood to use better qualities than is generally supposed. In the second place, actual experimentation in the Negro market by numerous local distributors and a few aggressive national advertisers has definitely established the fact that certain simple and reasonable supplements to regular sales methods make it possible to reach the heart of the Negro community more directly and completely. These procedures secure more lively responsiveness than would otherwise be the case.

What should the food manufacturer do who contemplates some special attention to the urban Negro market? He will, of course, seek in the first place to gain a rapid, complete, and secure goodwill for his products, at a cost justified by the expected sales.

How is this to be done? For one thing, it will usually be advisable to employ a limited number of carefully selected Negroes. Their main duties will be in promotional work, but in some instances they will also carry out part of the actual selling process. For another thing, it will be profitable, in some areas, to use the Negro press for reaching this market for publicity and advertising purposes.

The number of Negroes to be used and the extent to which it will be advisable to advertise in Negro newspapers will depend upon numerous and varying considerations. Among these will be the extent to which distribution taps urban centers with large Negro populations; the usual frequency of purchase of the products being marketed; the nature and severity of the competition; the way in which the regular sales force is organized in the field; and whether the business to be sought is in the North or the South.

In some areas the size of the market will justify permanent maintenance of such Negro employees. In other areas the policy may demand maintenance of these employees on a migratory basis, striking forcibly here and there to build up lagging good will. In either instance this work should be followed up aggressively by the regular sales personnel through trade channels.

Using Special Employees

The activities of these Negro employees will vary from the conducting of cooking schools or food demonstrations, conducting store demonstrations, making educational talks, presenting educational movies, to actual selling to Negro merchants and such Negro institutions as restaurants, schools and hospitals. The use of even a very few Negro employees in these ways, with intelligent direction, should result in a marked increase in good will and actual sales. Such activities will invariably strike a most responsive chord in the very soul of the urban Negro community. Some use of Negroes in the sales program is desirable because they are familiar with the social mechanism of the Negro neighborhood. They gain the confidence of their own people.

Underwood & Underwood

Sidewalk vegetable stand in front of urban market catering to the Negro trade.

There is nothing new or revolutionary in this method of approach to the business of the Negro community. It has been used with sufficient frequency by local white enterprise, both North and South, to prove that it is effective. Negroes are today being used by local white enterprises in the sale of such products as automobiles, tires, gasoline, electric refrigerators, foods, hosiery, and life insurance. They are employed as clerks in many of the white chains as well as in independent white grocery stores. Careful experimentation by the national advertiser has demonstrated that this course is profitable, not only to him but also to those associated with him in selling—the wholesaler and retailer.

It is exceedingly important to bear in mind that Negroes and Negro newspapers employed in these ways are used almost exclusively in Negro neighborhoods. They supplement and do not supplant white salesmen and the white press. In no sense does their employment involve their substitution for the white employee and the white advertising medium. As a matter of fact, utilization of Negroes in connection with the sales program in urban Negro neighborhoods has in more than one instance brought added opportunities to the regular sales organization.

Problems are sure to arise in the conduct of intensive work in racial or other group markets. No definite instructions could, of course, be outlined here for meeting them. They will vary in each individual case. To meet these problems in the case of urban Negroes, a thorough understanding of their customs, attitudes and tastes is essential. Failure to make clear to the wholesale and retail trade the purpose of the work contemplated; failure to use proper care in the selection of Negro employees; these and other shortcomings end not only in poor results, but in embarrassments as well. More than any single requirement such work should be maintained under capable, informed, sympathetic direction. If this is done it should prove decidedly advantageous to all concerned and result in more lasting good will.

AIR CONDITIONING *PAYS* —In Mexico, Too

Part of the installation of twelve macaroni drying rooms at the Mexico City plant of Productos Alimenticios, S. A. These have been built to make use of conditioned air in drying the product. Recording instruments are in the cabinets near the doors of the rooms. Macaroni presses can be seen at the rear of the room.

MONTERREY, MEXICO — We wish to refer to the article in FOOD INDUSTRIES, July, 1936, pages 330 and 331, entitled "Cuts Production Time 45 Per Cent—Eliminates Spoilage 100 Per Cent." We have derived great satisfaction from this article because both the conclusions of the author and the advice that he offers are in perfect accord with our experience in this phase of macaroni manufacture.

Our company was organized in Mexico City in September, 1932, having acquired the best macaroni factory existing in Mexico at that time. In July, 1933, we acquired a new plant in the city of Monterrey. In 1934, we enlarged the Mexico City plant, about doubling its capacity and installing new equipment for cracker baking and making macaroni pastes. In the same year, a new building was added at Monterrey, and new equipment was installed there in 1935.

Today, we have the two largest, most modern and sanitary plants for producing crackers, macaroni and macaroni pastes in Mexico, and probably in all Latin America.

In remodeling these plants, and reaching our present position of leadership, we encountered some serious difficulties. Their solution bears on the article in FOOD INDUSTRIES, already mentioned.

The most important problem encountered was in the drying operation. When the plants were bought, the method in use was old-fashioned, employing drying rooms equipped with steam coils and ventilators. With these, we were uncertain as to the quality of the finished products, being unable to determine the temperature at which drying was done. Also, in these old drying rooms the time factor was serious, as it required from 120 to 140 hours to carry out the drying operation.

When the company undertook to enlarge its plants, under the progressive guidance of its president, Mr. F. T. de Lachica, experiments in drying room construction, operation and equipment were made. The first trial of an automatically controlled drying room was made in September, 1933. In it, we obtained a properly dried product in 56 hours.

A long series of such experiments was carried out. Changes occuring in the macaroni, minute by minute as it dried, were determined under varying conditions. Also, the proper operation of the controlling devices was determined. Standard operating charts, giving the best finished goods for each type of product, were drawn up from the test data. Following these, we now dry macaroni and spaghetti in 46 hours, and such smaller products as noodles and vermicelli in 20 hours.

Flour enters our mixers at a temperature varying from 65 to 70 deg. F. It is not stored in air-conditioned rooms and hence is subject to variations in outside temperature. We compensate for changes in flour temperature by changing the temperature of the water used in the mix, as well as by varying the preliminary drying which all our products receive before going into the air-conditioned rooms.

To avoid drying on the surface of the mix, we use the old system employing wet cloths to cover the dough. We also keep the batches of mix small, in order to feed our presses with fresh dough as frequently as possible.

Our automatic dryers are not tightly sealed. On the contrary, the air is constantly renewed, while at the same time temperature and humidity are controlled by the automatic control instruments, so as to obtain an even drying at the proper humidity, without the growth of mold or the souring of the product. This temperature and humidity are changed from time to time during the drying, in accordance with a prearranged schedule.

In addition, we also air-condition the work rooms. All apparatus is constantly under the care and ob-

servation of experts. In this way, any loss of product is avoided.

After three years of experience with conditioned air, we are fairly content with the results and would not go back to the old ways. On the contrary, we are determined to continue our experiments, in order to further improve both our operations and our products.

FRANCISCO VALDES
Director General, Productos Alimenticios, S. A., Monterrey, Mexico.

Professor Ewell Disagrees

WORCESTER, MASS.—I found the reprint of the article upon the use of ozone in cold storage upon my recent return from Europe. If possibly you would be interested in comments, I submit the following:

Remarks upon Article upon "Ozone & Ionized Oxygen," page 307, June, 1936, FOOD INDUSTRIES.

1. Recent investigations of the sterilizing effect of special mercury lamps have shown that the effect of ironized oxygen is small, but that the ultra-violet radiation is so remarkably diffused that sterilization due to the diffused radiation is effective far from the direct rays.

2. The most extensive use of ozone as a deodorant, with which I am familiar, is in the destruction of the odors from citrus fruits brought from South America to England in conjunction with cargoes of meat. It has been most effective in protecting the meat from citrus odors and flavors which were a serious difficulty until ozone was introduced.

3. High concentrations of ozone for long duration will certainly turn the fat of meat rancid. Such, however, has never occured with the concentrations used in the limited number of meat houses in America using ozone, and the great number of such warehouses in Europe.

4. The writer has never observed any effect of high concentrations for long durations of ozone upon celery. While it has not affected the color, it has very little effect upon the fungi so frequently prevalent upon celery.

5. Brass pipe is the best method of conducting ozone from the centrally located ozonator to the point of distribution. Unless the fan is allowed to blow for at least fifteen minutes after the ozonator is turned off, moist air will work back into the pipe and with the remaining ozone cause deterioration, as stated in your article. The best procedure is to have the pipes for several feet from the point of distribution constructed of block tin.

6. A concentration of 0.5 parts per million will not prevent bacteria and fungus growths in egg rooms. A minimum concentration of at least 0.6 parts per million is necessary to inhibit spores of mold, and much higher concentrations are required to actually remove mold—a concentration of 2 parts per million being sufficient in meat rooms if the mold growth is slight.

ARTHUR W. EWELL,
Director of Physics Department, Worcester Polytechnic Institute, Worcester, Mass.
Consultant for a number of large cold storage plants and manufacturers of ozone equipment.

EDITOR'S NOTE—*Though this comment comes a half-year late, we are glad to give it to our readers, for we love a debate. In rejoinder we quote the first sentence from the original article. "An investigation into the uses of ozone and ionized oxygen in the realm of controlled atmospheres leads one into a region of some controversy."*

Some users of ozone say it will. Professor Ewell says it won't.

On with the controversy!

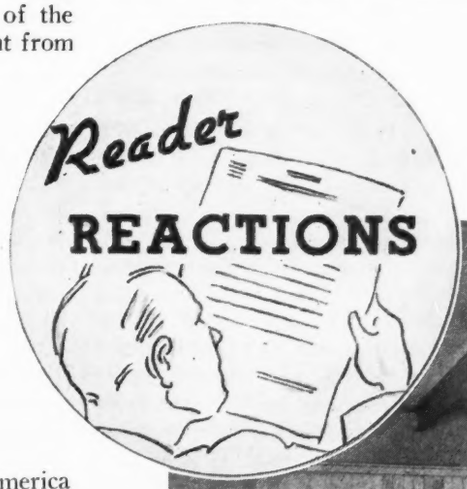
Pay Increases

PEORIA, ILL.—The little discourse on the Everyday Operating Problems page of the October FOOD INDUSTRIES, on the subject of legitimate reasons for pay increases was provocative of a train of thought, touching a certain peculiar connection between incentives and pay increases. As a general rule, when incentives in industry are mentioned, it is at once supposed that some incentive is being given to the men by the management in an attempt to obtain certain results. But incentives have the opposite application as well, in particular where the pay check is concerned. There must be an incentive for raising a man's pay before it will likely be done.

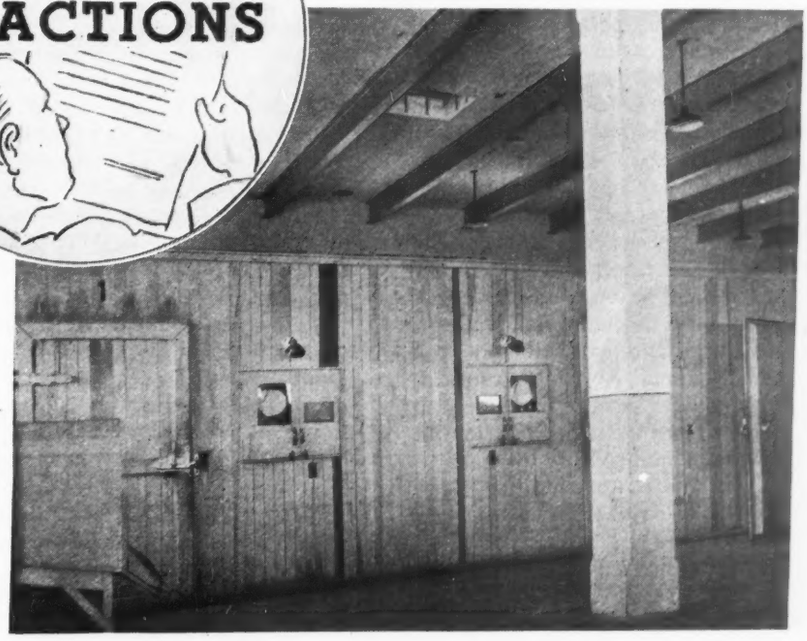
There are many incentives that can be used by a foreman to have his pay increased. If he can show an outstanding record as to freedom from loss of time through absenteeism, either of himself, of those under him, or both, the advantages accruing will have a real monetary value. If he and his department can hold an untarnished record as touching accuracy, or versatility, or possibly of ingenuity and aptness for finding and putting into practice better methods, it cannot fail to come to the notice of the superintendent, and through him or otherwise to the manager.

It remains for the individual foreman to select those incentives which he feels are best adapted for practice in his particular sphere, and to apply them intelligently and persistently.

JOHN E. HYLER



Some of the drying rooms at the Monterrey plant of Productos Alimenticios, S. A., showing how the controlling and recording instruments are installed in cabinets, behind locked doors having glass panels to permit observation.



Selective Selling Wins

Small dealer works out method that brings success. Can be modified for use in merchandising any food.

By W. A. UNDERWOOD
Cleveland, Ohio

"FAR fields are greener." Actually they are not, they only look that way. The old proverb reflects the very human tendency to think that what the other fellow has is better than what we have. And that has a very important bearing on selling costs.

In one respect the food business is peculiar. Humans can live without books, or automobiles, or radios, or shoes, or shelter. Lots of them live that way. But no one can live more than a few days without food. And that fact also has a very important bearing on selling costs, for it leads to the false assumption that, because everybody must eat, that everybody is a prospect for each company within its distribution radius.

It simply isn't true. Race, religion, environment, wealth, local custom, social pressure, personal likes and dislikes, the necessities of diet—all these combine in varying amounts to affect the market of every food manufacturer. Marketing plans without sufficient or correct allowance for them cost the food industries tremendous sums each year.

During recent calls on several hundred food manufacturers east of the Mississippi River, I was much impressed by the emphasis which they place on the importance of increasing sales volume. Also by the extent to which they seem to rely on main strength and awkwardness, instead of careful planning and administration.

This widespread desire for increased sales has a reason which is self-evident. There are only a few ways to increase profits. Of these, increased sales volume offers a very considerable reward in the way of decreased unit costs. Nevertheless, more efficient production methods, low cost equipment, lower raw material costs, elimination of waste, can also produce lowered unit costs. Yet one does not need to be an accountant to realize what effect an increase in output from 60 per cent to 80 per cent of plant capacity can have.

THERE are three ways, and only three ways in which to increase sales: (1) Increase the number of customers; (2) Increase the amount of use by present customers; (3) Increase the frequency of use by present customers. The second and third methods include such things as the introduction of new or supplementary products, or new and supplementary uses of present products. Examples of these are Standard Brands promotion of yeast as a food as well as a leavening agent, or Wupperman's promotion of Angostura Bitters in sausage as well as in cocktails.

The obvious way to increase the number of customers is to sell in a wider geographical area. There is nothing wrong with national or even world-wide distribution, provided that it is the most economical for the company. It must assure the most favorable unit costs and the largest net profits.

The big objection to overly extended distribution is that it is wasteful. To illustrate: the Dow Chemical Company is recovering certain mineral salts from seawater—mostly bromine compounds. Yet it is not recovering gold from seawater despite that well known fact that the ocean contains vast quantities of gold. Why is this? Experience has shown that there are only certain things present in seawater in quantities high enough to render their recovery profitable. But gold is not one of them.

Something of a loose analogy may be set up between the foregoing example and food merchandising. To illustrate: the primary market for Italian olive oil is in the "Little Italies" of New York, Chicago and other large cities. Throughout the remainder of the country there are, here and there, occasional families which have a taste for Italian olive oil. Among the 50,000,000 or more people living in the small-town market there may be enough such people to make up a market equivalent to Cleveland's Italian market. But, even if this were true, the importer who attempted to build his business upon their needs would likely find his sales expense more than his gross profits.

Such an exaggerated example of what is hypothetically a major market illustrates the phantasy that is pursued to a lesser extent by food manufacturers every year. Even distant parts of a city hold a lure.

How a certain milk dealer perceived this danger and avoided it is a very profitable lesson. What he did was neither intricate nor expensive. And it can be duplicated by any executive in the food business who is interested in profitable selling. The facts are as related, but the identity of the dealer is withheld; likewise his locality. For convenience I shall refer to him as Mr. Smith, operator of the Smith Dairy somewhere between the Mississippi and the Alleghenies.

Smith's dairy is in a manufacturing town of 25,000, and his business consists mainly of house to house sale of bottled pasteurized milk. Also he does a small amount of wholesale business to retail stores in his town. During the depression his sales were adversely affected by reduced purchasing power, lower prices, and keener competition for business. More volume was indispensable. It was a question of survival.

HE also realized that there was no point to attempting to increase the area served. That would merely increase his distribution costs. Also it would increase the amount of his competition and invite his competitors to shoot at the volume of business he still possessed. Nevertheless he *had* to have more sales. But he could not afford to spend much money, or to take avoidable risks.

Of course he realized that, of the several thousand families in the town, he sold to only a very few hundred. Some of them, he knew, were in very comfortable circumstances, while others were badly crippled, financially. Many were down and out. He did not jump to the conclusion that the comparatively well to do were his best prospects.

Instead, he went to his records and studied them carefully. He sought and found the answers to the following questions, as completely as his records could supply them:

1. Who, by name, are my lost customers?
2. What kind of people are they?
3. Where do they live?
4. Who, by name, are my new customers?
5. What kind of people are they?
6. Where do they live?
7. What population shifts are taking place among my customers?
8. What kinds of people buy various quantities of milk—two quarts, one quart, one pint, etc.?
9. Where do they live?
10. By what characteristics can I recognize people like them?

Obviously, the answers to questions 8 and 10 were the most important, and the answer to No. 10 was an inference from No. 8.

It soon developed that his best customers were not the well-to-do. Even if it had been so, it could not have helped much, for there were not enough of them.

The people who bought milk in better than average quantities, day after day, from Smith's Dairies, were families in which father had steady work in industry or commerce at fair wages. Father and mother were in their twenties or early thirties, and they had small children. He found that, where these conditions were backed up by better than average purchasing power, their purchases of milk were better than average. But such cases were comparatively few. For the first time he realized that the backbone of his business was the middle class and lower middle class family, under 35 years of age, husband steadily employed in a small job, and where there were children.

Similar families must also be his prospects.

Knowing this, Mr. Smith began to do something about it. To each route salesman was assigned a list of lost customers, or customers whose purchases had declined. He did not give his salesmen a canned sales talk, but he made sure that they had sales arguments. And he required them to make two calls per day, as a minimum, on the families on these lists to sell them again on the Smith Dairy. This part of the campaign was very gratifying in customers and volume regained.

The next thing was the drive for new customers. This effort has been and continues to be continuous rather than spasmodic. In the usual ways—school registrations, street and telephone directories, personal acquaintances, inquiry from customers, and the like—he built up a list of prospects. Then he culled the list until it consisted of people who met the test of what constituted a better-than-average customer—reasonable purchasing power, and children.

Lists of prospects were arranged according to existing routes. Each salesman was required to make not less than ten calls per week. If a first call did not produce, a second call was made, and then a third.

It would be a dramatic tale, if Mr. Smith had gone in for expensive sales promotion. But he did not. It would be interesting to read about the thousands of mailing pieces he sent out, or the full pages in the daily papers, or the 24-sheet posters on every billboard around town.

HE did none of these things. In the first place, he didn't have the money. And even if he had had it, he wouldn't have used it that way. He was out to build sales volume, and he stuck to straight selling, although he is now supporting his direct selling by a reasonable direct mail program.

Through simple analysis of his opportunities he has succeeded in building up his number of customers to the highest level in his business life. His sales volume has increased faster than his number of customers.

What he has done is not beyond the power of any food manufacturer, although the mechanism will differ from case to case. Had he been primarily a seller through dealers, he would have had to modify his procedure, but the modifications would have been obvious. Had he been a regional or a national manufacturer, selling through wholesalers, his analytical procedure would have been more complex. He might have felt it advisable to call in expert market research consultants, but the fundamentals would have been unchanged.

Front view of nine of a new fleet of twelve International tractors and Fruehauf semi-trailers used to replace conventional trucks by Safeway Stores, Inc. These combinations serve 204 meat and grocery stores in Colorado. The semi-trailers are of the dropped-frame type for easy sidewalk delivery. They are semi-insulated, but not refrigerated.

Body Builders *Step Out*

Food Hauling Becomes More Complex, But Improved Skill Makes More Economical Equipment, as Shown by the Four Body and Truck Combinations Discussed

FOOD transportation problems become more complicated. Requirements of insulation and refrigeration of truck bodies must be met. Bodies and trucks must be designed to accommodate an increasing variety of food products. At the same time, the cost of distribution by trucks must be kept low.

The tasks involved are difficult, yet the art of motor equipment design is adequate. Engineers of the truck and body building industry produce economical solutions of whatever problems are presented.

Four excellent recent examples show the diversity of motor truck equipment that is available to meet the needs of food concerns.

One of these examples is a fleet of twelve new International tractor and Fruehauf semi-trailer combinations used by Safeway Stores, Inc. Nine of these are shown in one of the photographs. Their job is to supply 204 grocery and meat stores throughout Colorado.

Nine of these Safeway units operate from the company warehouse in Denver, the other three from another warehouse in Pueblo. This new fleet replaces straight, or conventional two-axle trucks. A total daily mileage of 2,000 miles is covered by the fleet in servicing the 204 stores.

These tractor-trailer combinations were selected in place of conventional trucks primarily because of greater load carrying capacity, which gives a lower unit haulage cost. They also give greater ease of handling on Colorado's many mountainous roads, where sharp, corkscrew turns and long, steep grades abound.

SEVERAL of the routes run from an altitude of 3,000 ft. up to 10,000 ft., and back again. Such changes in elevation are accompanied with marked temperature changes. As a consequence, carburetor adjustments must be made, and also adequate insulation must be provided to protect the fresh meat shipments against temperature rises in summer and freezing in winter. Hence, the semi-trailer bodies are of the standard Fruehauf semi-insulated type. They also have dropped frames, right-hand side doors for easy sidewalk deliveries, and all metal, rust resisting roofs.

Another illustration shows the hauling equipment used by the Gilbert Grocery Co., Portsmouth, Ohio. This is employed in handling l.c.l. fresh fruits and vegetables from the Cincinnati market, and in servicing cash-and-carry stores in Jackson and Gallipolis, Ohio. The problem was solved by the choice of a conventional Autocar cab-over-engine truck and an Edwards convertible four-wheeled trailer, as shown in the photograph.

The truck and trailer bodies, made by the Orrville Body Co., Orrville, Ohio, are of the same size and of like construction. Each carries a load of 6,000 lb. When the load is over this weight, both truck and trailer are used. When the load is 6,000 lb. or less, the truck alone is used, thus providing a flexible means of suiting the needs of the day's business.

Each body is 16 ft. long, 7 ft. 6 in. wide, and 6 ft. 9 in. high, inside measurement; and has four full-height doors, one on each side and a double

door at the rear with an 18 in. outside tailgate. The bodies are insulated, but not refrigerated. The insulation consists of 1 in. of Dry Zero in roofs, sides and ends, with 1 in. of cork in the floors. This insulation is adequate to prevent the entry of excessive heat in summer and to prevent freezing in winter.

While the two preceding examples have had to do with the hauling of food products in comparatively large or wholesale quantities, the third example covers the retail delivery of fresh fish. This problem was solved by the use of a 1½-ton Diamond-T truck with a refrigerated body of most modern design.

Reference to the photograph will show the low height of the body of this truck, which is the main feature of its outside appearance. The body roof line is level with the truck's de luxe cab. The body skirt is carried down level with the cab step.

This fish body is 9 ft. long and has a center aisle for its full length, with refrigerated compartments on both sides. The refrigerant is dry ice, carried in roof hoppers. For advertising purpose, each body side carries a hand painted deep sea scene, with swimming fishes. The truck is operated by the Flint Mercantile Co., Denver, Colo.

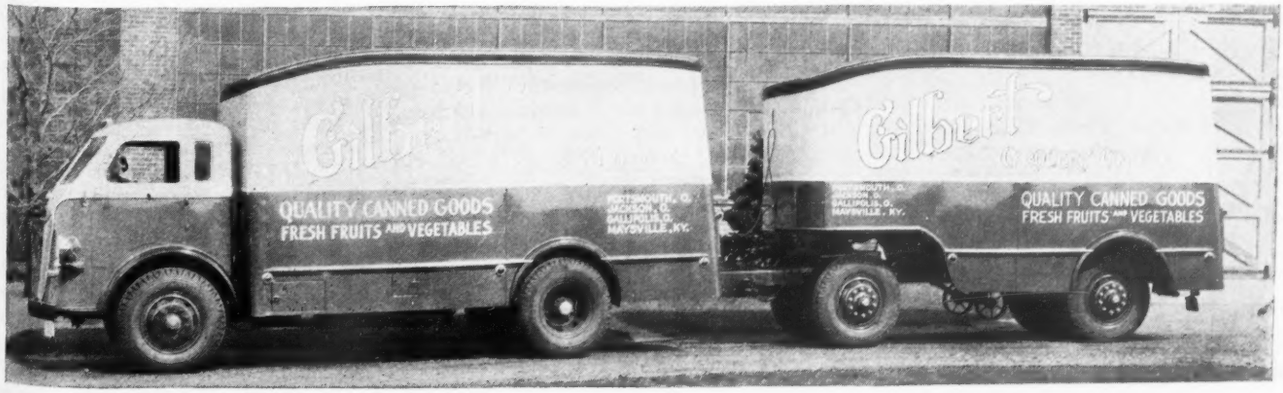
The fourth food delivery example has to do with serving 127 bakery stores owned by Van de Kamp's Holland Dutch Bakers, Inc., within a radius of 30 miles of Los Angeles, Calif. In this work the company uses 1½-ton trucks within a 5-mile radius; 2½-tonners within a 10-mile zone; and two of the new 3½-ton Autocars shown in the photograph to reach out 30 miles from the plant.

Greater body length is obtained by the use of the cab-over-engine Autocar. The body is insulated. It carries 250 different varieties of bakery products in 280 Van de Kamp standard bakery cabinets.

This truck, in one three-hour round trip, does the work formerly done by two intermediate size trucks and one light delivery truck.

Ultra-modern refrigerated body on a Diamond-T chassis, used by the Flint Mercantile Co. for the retail delivery of fish and sea food in Denver, Colo. Note the low body roof line and the hand painted deep sea sign on the body side.

One of the Autocar cab-over-engine trucks used by Van de Kamp's Holland Dutch Bakers, Inc., for the delivery of 250 different bakery products within a radius of 30 miles of Los Angeles, Calif. The cab and body are painted white. The sign on the side is baked enamel. The lettering is in blue. The vanes of the windmill on the sign at the side are operated by a small motor in the truck, actually turning while the vehicle is in motion.



One of two truck and trailer trains operated by the Gilbert Grocery Co. to haul its l.c.l. fresh fruits and vegetables from the Cincinnati market to Portsmouth, Ohio. The combined capacity of truck and trailer is 12,000 lb. For lighter loads, the truck alone may be used. The truck is an Autocar and the trailer, an Edwards. The color combination is green and ivory, green on the lower panel and ivory on the upper, with lettering in silver.

Do Puncture-Proof Tires Pay?

INNER TUBES are a small item. But when you get down to considering the advantages of puncture-proof tubes and weighing them against possible disadvantages and higher costs, there are many questions to be answered. One wants to know their principal value, as determined by actual operation, and whether their benefits justify the cost. Then there is the problem of whether puncture-proof tubes are better than puncture-sealing compounds, and whether the extra weight wears the tires faster or unbalances the wheels. Moreover, the fleet operator must decide whether to equip his truck with puncture-proof tubes and dispense with a spare tire.

All of these points, and more, are discussed in the following paragraphs by fleet operators who have learned the answers through experience.

Give Greater Mileage

PUNCTURE-PROOF tubes save changing a tire on the route and they give greater tire mileage. We have never used puncture-sealing compounds, but we find that puncture-proof tubes justify their extra cost. We believe it is more satisfactory to use puncture-proof tubes and not carry a spare than to use ordinary tubes and carry as a spare a tire which has been removed from regular service.—*Golden State Co., Ltd., San Francisco, Calif.*

Wear Tires Faster

WE tried puncture-proof tubes about five years ago but did not like the results we got with them. It is true that they reduced our punctures from 50 to 60 per cent, but they wore out our shoes faster than they should. When a tire picked up a nail which did not injure the tube, no one in the garage would pay any attention to it. Therefore, we discontinued them.

We have never used puncture-sealing compounds.

Our trucks do not carry spares, as all of our deliveries are within 10 miles of the garage. If our driver finds that a tire is flat, he phones in to our garage and a mechanic takes a spare to him.—LOUIS R. LIPMAN, *Parkway Baking Co., Philadelphia, Pa.*

Nails Damage Casing

PUNCTURE-PROOF tubes have been used by us in very limited numbers, and puncture-sealing compounds have never been used. Our only objection to puncture-proof tubes, and the reason they were discontinued, was because the tires picked up many large nails and other obstacles from the highways but did not go flat. Then the nails would work in the casing over 40 or 50 miles of operation until the casing was torn badly, which in the long run, we thought, was considerably more costly than the delay in changing the tire on the road.—R. F. GRAY, *Transportation Manager, Geo. A. Hormel & Co., Austin, Minn.*

Cost Sometimes Justified

WE do not use puncture-sealing compounds, but we have used puncture-sealing tubes extensively. The material advantage of the latter is the elimination of load delays due to punctures. Under the conditions which we use to determine the necessity of their installation, puncture-proof tubes justify the extra cost. We show increased mileage by use of these heavier puncture-proof tubes.

In metropolitan areas, satisfactory and economical operation can be maintained without spare tires when puncture-proof tubes are used.

We carry spare tires on equipment not provided with puncture-proof tubes, and on all long-distance trucks irrespective of tube equipment.—F. L. FAULKNER, *Automotive Department, Armour & Co., Chicago, Ill.*

Good on Short Hauls

PUNCTURE sealing compounds are not as satisfactory as puncture-proof tubes. The latter, due to the fact that they maintain air pressures and eliminate the hazard of running on flat tires, increase the mileage obtained. Their extra weight does not reduce mileage.

It is more economical to use puncture-proof tubes than a spare for city and suburban deliveries of 50 to 75 miles a day. But we do not recommend that type of tube for long-distance hauling or for use in tires of a size exceeding 32x6 in. Trucks making long hauls or using large tires should by all means carry a spare.

Puncture-proof tubes can be punctured by large spikes or nails, particularly if these penetrate the sidewalls.

National fleet owners can buy puncture-proof tubes at attractive prices, while the small operator may be compelled to pay a price which in some cases pretty nearly equals the cost of a tire. This may prejudice the small operator against investing money in this type of tube.—L. J. SCHUMAKER, *President, American Cone & Pretzel Co., Philadelphia, Pa.*

Distribution QUESTIONS CLUB

Ruined By Improper Clean-up

IF you could read the confidential report on what really happened at the X—— Co. plant in midsummer of 1936, it would not be necessary to go into a further discussion of the money value of cleanliness—scrupulous cleanliness. But the report is confidential and may not be quoted. A confidence is a confidence.

Going Broke Because of Dirt

Now that the X—— Co. is in serious difficulty because it was not scrupulously clean, it is highly probable that even the most reluctant, unwilling worker in the place wishes that some one in authority had stood over him with a club and insisted on proper cleanliness. It looks as if the company might fold up.

Some People Naturally Dirty

Unfortunately there is always a sizeable percentage of people who have not the slightest idea of what a thoroughgoing clean-up job really is. And sometimes they work in food establishments. Their personal experience before coming to work in a food plant lacks nearly everything that suggests order, cleanliness or sanitation. Though they ought not to be hired, such employees can usually be taught sanitation and cleanliness. But they have to be *taught*. They don't bring the cleanliness idea with them. They have no idea of *why* it is necessary, and still less of *how* to do a decent clean-up job.

Ignorant Management — An Affliction

And, of course, when the owners or the management have very sketchy ideas of why or how to keep a factory clean, what incentive is there for the help to do it? That predicament seems to describe the case of the X—— Co. Space will not permit a detailed explanation of the direct connection between a bunch of damage claims—about 100 were made ill and many went to hospitals—and the dirty place in which the food was manufactured.

Everything Done Wrong

The whole matter boils down to an abysmal ignorance of the most elementary knowledge of how to clean up after a day's work. Rinsing machinery and other equipment with cold water was their idea of a clean up. Rats ran all over the place. A soiled rag was used to wipe tables which came in contact with food. At the same time they were producing a food in which bacteria could grow easily and make it capable of producing severe illness.

Inadequate cleaning, as a rule, does not result in damage to life and health. Ordinarily it results in reduced quality, or actual spoilage to the extent that the food must be destroyed. It is only the occasional example like this one that serves to focus attention on the real value—the prime necessity for a scrupulously clean plant.

Tyrant Needed

Whenever you visit a plant that is immaculate, you can put it down that somewhere in the organization is a tyrant who is a stickler for cleanliness. And unless there is some one like him in authority, the whole place is likely to become slovenly.

One Way to Impress Them

On occasions in our own experience, we, ourselves, have had a few battles for cleanliness. Names, that generally are considered fighting words, have been hurled at us. But the help were not allowed to leave the plant until the job was done right. You don't have to keep the gang many hours overtime more than once to impress on them the right way to clean up. Of course, it means that you, too, go without your supper.

What It Takes

Good cleaning takes knowledge, and energy, and lots of plain old elbow grease. Also, it takes patience and thoroughness.

Dragging a wet mop over dirt on the floor is not mopping. Squirting a weak stream of cold water on machinery is not often effective cleaning.

Wiping a dirty object with a cloth, wet or dry, will not clean it. Actually, it may make it worse in the sense of bacterial contamination, though it may look good.

Soap or other cleansers, brushes, and hot water under pressure are very important aids to cleaning. And a steam hose is good for drying equipment after it is clean.

Periodic fumigation is a big help. Rats, mice and cockroaches have no place in any food plant. Get rid of them.

But above all is needed a management that *demands* cleanliness.

Mono-Sodium Glutamate For Meat Flavor

GLUTAMIC acid, a normal constituent amino acid in many proteins, has attracted the attention of food manufacturers from time to time. Its monosodium salt, sodium glutamate has a flavor much like beef extract and it has been frequently used for giving a meat flavor to foods, particularly in the orient and certain countries in Europe. It is claimed by some writers that one part in 3,000 parts of water will taste perceptibly like meat extract.

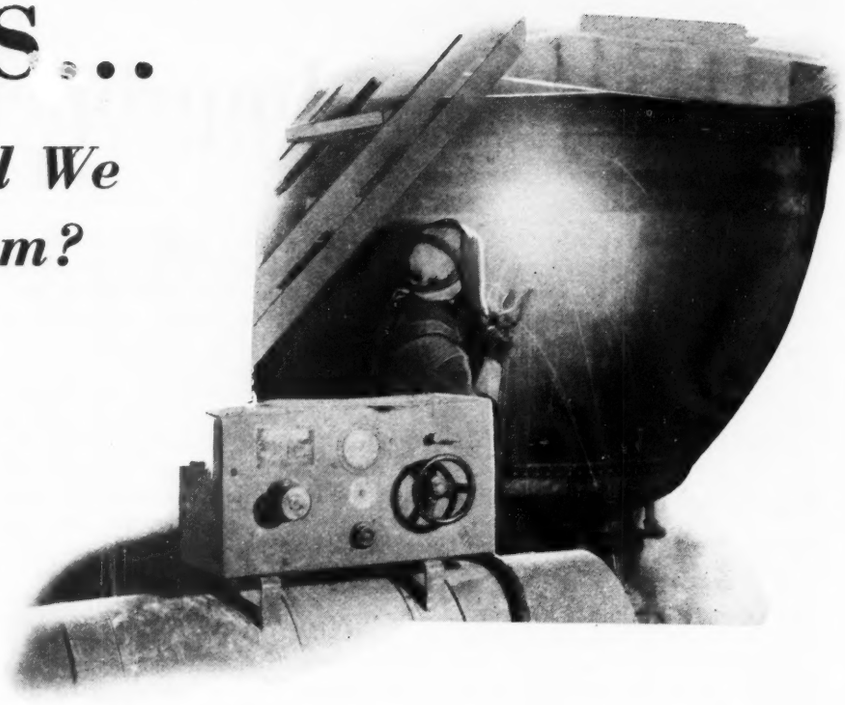
In the trade it has a variety of names, some of them decidedly oriental, such as Aji-No-Moto, Vetzesin, Gluta, Aji, Chuyu. Other names, apparently coming from Europe, are Viandarome, NuVeg and Savita. There are still others that we cannot recall.

Common sources of glutamic acid are the gluten of wheat, also the soy bean, beet molasses, fish protein, and seaweeds. It is produced in many countries including the United States. A Japanese firm, Suzuki & Company, seems to be the exclusive selling outlet for most of the domestic products, but imports come from a variety of sources under a confusion of names. Still more confusing is the matter of different prices asked for the same product under its different names.

To those who are interested in experimenting with glutamic acid or are already using it, it is suggested that samples be analyzed for both glutamic acid and common salt (NaCl) before ordering. Deliveries should also be checked up. Generous proportions of common salt are occasionally found mixed with mono-sodium glutamate, but there is no need to pay ten or twelve prices for so cheap a commodity. And one should always be wary of mono-sodium glutamate when its price is way out of line.

REPAIRS...

When Shall We Make Them?



WHAT system do you follow in doing your repair and maintenance work? Some plants find it best to carry on this work continuously, while the plant is in operation. Others make periodic shut-downs so that the equipment can be overhauled and put into good shape without interfering with production operations. Still others use a combination of these two systems. Finally, there are plants, as in the canning industry, which do not operate throughout the year, and therefore try to do repairs when the plant is closed for the season.

Has Systematic Inspection and Repair Service

Our system is periodic inspection by members of the mechanical department staff as frequently as seems necessary for the type of machines involved. If inspections indicate that certain machines are in need of repairs of any kind, the work is done at the most convenient times.

If inspection indicates that immediate repairs are necessary, the work is usually done on the week-end following the inspection; that is, if the repair is not too extensive to be accomplished in the time available. In case work has been started and cannot be finished during the week-end, it is, of course, necessary to keep the machine out of production until the repairs can be completed. In most cases of this kind, the loss of production is not serious because many departments have a number of similar machines.

When inspection reveals the need for a complete overhauling or rebuilding, it is nearly always possible to defer the work until one of our semi-annual shut-downs. They come in July and January. The inspection service and the routine repairs are intended to keep the machines in proper operating condition so that breakdowns will not occur during working hours. This is accomplished in a large measure. If, through careless operation or some defect overlooked by the inspectors, a machine does break down during working hours, repairs are made immediately. They are either permanent or temporary, depending on the length of time required and the need for production on the machine. If temporary repairs are made, of course the permanent repairs follow.

Adjustments and minor repairs as well as greasing are often done while the inspection is being made. For instance, such items as hangers and bearings on overhead shafting, hangers and mobile equipment for monorail conveyors are inspected, tightened, adjusted and greased where necessary by shop mechanics. This is done at least once a year and in some cases oftener.

On many of the machines it is necessary to dismantle partially for inspection. This is done annually in the case of prime movers on refrigerating machines and on electric generating equipment. Many of our machines have been completely rebuilt once and some of them more than once.

A major objective of our management is to keep all buildings and equipment in first-class condition, orderly and workmanlike in appearance, clean and sanitary.—L. P. LEATHERS, *W. F. Schrafft & Sons Corp., Boston, Mass.*

Most Repairs Done During Week-End Shut-Down

It is always customary for us, whenever possible, to shut our mill down at 7 a.m. Sunday morning until 7 a.m. Monday morning. During this 24-hour period, the millwright crew works until all necessary repairs are completed. At the same time the bolter and grinder operators repair belts, sieves, and other working parts. This entire procedure generally takes from six to ten hours during the Sunday shut-down. Of course, there are repairs which must be done during the week, and at times require shutting down one of the four units. Some repairs can be made on the run without shutting down, and whenever this practice is possible, it is taken advantage of.

Once a year when we close down for fumigation, the plant is given a thorough cleaning. Necessary repairs which have accumulated are then taken care of.—L. H. PATTEN, *State Mill & Elevator, Grand Forks, N. Dak.*

Next Month's Question

Plant clean-up activities are among the most necessary operations in a food plant. Unless cleanliness is maintained, trouble is sure to come. So some one must be responsible for clean-up. Where do you put this responsibility? Is it the duty of the plant janitor force, of the department foremen or foreladies, or do you have a special production area cleaning force? And why did you choose the method you use?

Code Marking Labels

NEW canned goods labels with natural color reproduction of the contents are printed with blue marks in the black outer lap end of the labels for the purpose of code numbering.

The canned goods buyer when ordering labels for shipment will show on the order the code number to be used on the labels just as he always has done. On all the old style labels this number will be perforated as in the past.

The new labels, however, will be tied 500 in a bundle with cardboard on top and bottom. They will be tied so that it will be possible to inspect them without untying the strings. In addition to the usual inspection for quality of workmanship, it is necessary that these new labels be carefully inspected to make sure that the blue marks are clearly and uniformly shown on the left side of the label. It is necessary that these marks run the same throughout the bundle. Then, when the code marking is done by making saw-cuts to indicate the code numbers, the cuts will appear in the same location as to blue marks throughout the whole bundle.

In making the cuts, it is important that the saw be kept sharp and the bundle of labels be held securely in a wooden form so that they are square while cutting and the cut is clean. The saw cut must leave no ragged edges which would cause trouble in the labeling operation. The depth of the saw-cut should be a good one-sixteenth of an inch.

Each of the seventeen spaces on the left-hand side of the label indicates a number and these numbers begin with 1 at the bottom of the label and 2000 at the top, as shown by Fig. 3. The final code number is arrived at by adding together all of the numbers as indicated by the saw-cut spaces. In further explanation, if the number was *"2773"* the saw-cuts would be as shown in Fig. 3.—C. E. KAFKA, *Chicago, Ill.*

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Saving With Electric Drive

Agar Food Products Company in Chicago made a saving by installing an electric drive for its refrigeration compressor, according to *Factory Management and Maintenance*. This plant has a 20-ton vertical refrigeration compressor, formerly driven by a direct connected steam engine.

Operating costs for the compressor were high in summer, when there was no heating load, and the boiler had to be fired just to operate the compressor. Also, in winter, when there was no heating load on Sundays, the boilers had to be kept going to keep the ice machine in operation and apply refrigeration for the cold rooms.

Electric drive was substituted. A 40-hp. 860 r.p.m. motor was installed, driving through 18½ ft. of 10-in. leather belting. The motor was mounted on a vertical, pivoted base. The total cost of the new equipment was $420.

Operation with the new drive showed a saving of about $4 a day over the old method. This saving represents the

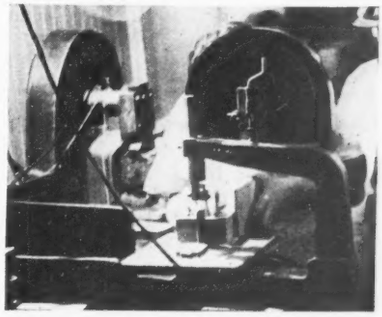

Fig. 2—Marking a bundle of can labels with code markings.

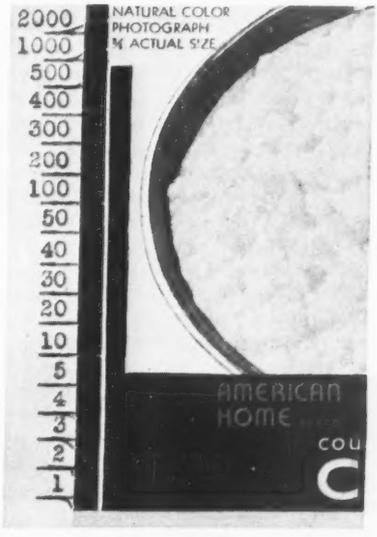

Fig. 3—A perforated label, coded as No. 2773. This photograph shows the key to the code.

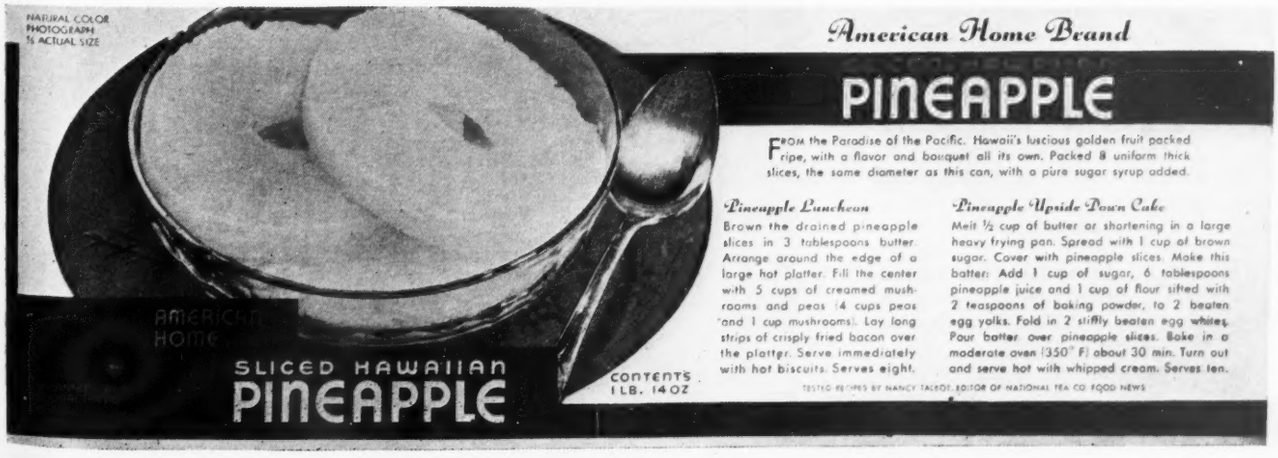
NATURAL COLOR PHOTOGRAPH ⅛ ACTUAL SIZE
American Home Brand
PINEAPPLE
FROM the Paradise of the Pacific, Hawaii's luscious golden fruit packed ripe, with a flavor and bouquet all its own. Packed 8 uniform thick slices, the same diameter as this can, with a pure sugar syrup added.
Pineapple Luncheon
Brown the drained pineapple slices in 3 tablespoons butter. Arrange around the edge of a large hot platter. Fill the center with 5 cups of creamed mushrooms and peas (4 cups peas and 1 cup mushrooms). Lay long strips of crisply fried bacon over the platter. Serve immediately with hot biscuits. Serves eight.
Pineapple Upside Down Cake
Melt ½ cup of butter or shortening in a large heavy frying pan. Spread with 1 cup of brown sugar. Cover with pineapple slices. Make this batter: Add 1 cup of sugar, 6 tablespoons pineapple juice and 1 cup of flour sifted with 2 teaspoons of baking powder, to 2 beaten egg yolks. Fold in 2 stiffly beaten egg whites. Pour batter over pineapple slices. Bake in a moderate oven (350° F) about 30 min. Turn out and serve hot with whipped cream. Serves ten.
TESTED RECIPES BY NANCY TALBOT, EDITOR OF NATIONAL TEA CO. FOOD NEWS
AMERICAN HOME
SLICED HAWAIIAN
PINEAPPLE
CONTENTS 1 LB. 14 OZ

Fig. 1—One of the new can labels with natural color reproduction of the contents

difference between the cost of current used and the cost of 200 gal. of fuel oil required for running the compressor alone from the boilers. It was further discovered that this saving applied as well to periods when the boilers were used for heating, as the fuel consumption rose 200 gal. per day when the steam engine drive was used.

The $420 investment was repaid by the savings of 105 days of operation and has been earning a clean profit of $4 a day ever since.

Avoiding Sewer Stoppages

PROPERTIES of the Los Angeles Union Terminal Company cover an area of about 21 acres in the Los Angeles wholesale district. Our tenants include packing sheds, vegetable washing concerns, creameries, candy manufacturers and many others. Their operations present a constant problem in keeping the sewers free from stoppages.

Naturally, a clogged sewer is an inconvenience of the worst type. I believe that our solution of this vexing problem should be helpful to others having problems of sewage disposal from food plants.

First, let me describe some of the exceedingly difficult conditions with which we were confronted and some of the troubles that we met in trying to solve these difficulties before we arrived at the solution which I will discuss here.

We have one stretch of basement floor drain, all of which is underground, and which serves part of our warehouse. This section, which is 550 ft. long, became badly stopped up by a combination of cod liver and other fish oils, mixed with dirt from the floors. Use of a lye solution in an attempt to clear this sewer, only resulted in the formation of an extremely hard soap that was next to impossible to remove.

The first 100 ft. of this drain was worked on from time to time over a period of several months. Finally, we penetrated the stoppage with one of those flexible reamers known as a "hand-snake." But the section was never thoroughly and satisfactorily cleaned.

It was on the second 100 ft. section that our real troubles commenced. Here we used three men, armed with steam hoses and hand snakes, for a full two weeks. The sewer was dug up in two different places. Finally, the job was abandoned, as the stoppage seemed to be getting harder, and the location of the drain made it almost impossible to get at by these methods.

One of our tenants is a vegetable packing company using two 4-in. drains 150 ft. in length. Through neglect, the strainers were left out of all of these drains. Consequently, the

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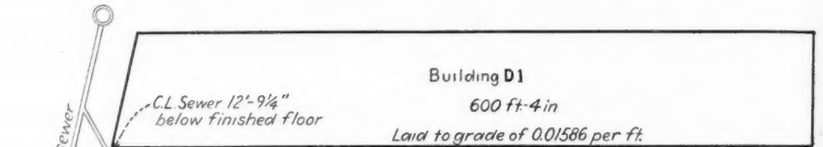
sewer became stopped with a highly insoluble mixture of carrots and sand.

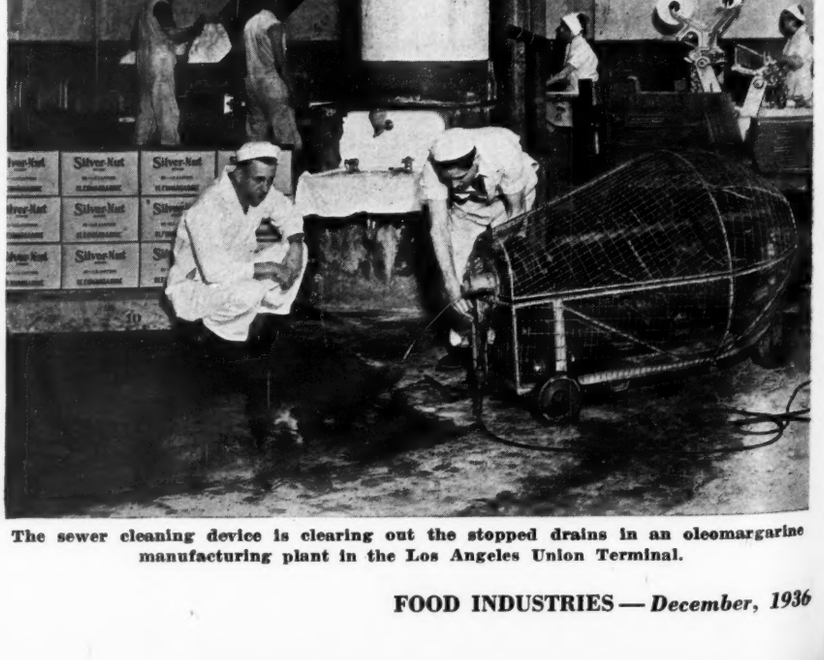
Another tenant, an oleomargarine maker, uses a sewer 500 ft. long, varying from 4 to 8 in. in diameter. This sewer used to require attention every week, because of the nature of the waste products. That always required at least a half day of time, just to restore service.

These were some of the troubles ended a year ago when we made a change in our methods. What we did was to adopt a different method of cleaning, employing a "Werko" sewer sweep. This is a portable outfit, operated by one man. Our machine has a 600 ft. cable, mounted on a reel, a revolving head that operates from 500 to 600 r.p.m., and employs a 1 hp., 110-220 volt motor that plugs into the lighting circuits. It will operate in a sewer from 4 to 12 in. in diameter.

With the new method, the two 150 ft. drains of the vegetable packing house, clogged with carrots and sand, were cleaned from end to end in four hours. The line serving the oleomargarine manufacturer can now be thoroughly cleaned in a little over an hour, and is so well cleaned that it now needs attention only every three or four weeks, instead of every week.



Layout of a part of the sewerage system of the Los Angeles Union Terminal Co.



The sewer cleaning device is clearing out the stopped drains in an oleomargarine manufacturing plant in the Los Angeles Union Terminal.

The basement drain, which had been given up as hopeless, was a real test of the new method. However, the machine penetrated the full 500 ft. of drain in 3½ hours, and the drain was thoroughly cleared and free of all foreign matter in 1½ days from the start of the operation.

We have one line 600 ft. long and 4 in. in diameter. This can be thoroughly cleaned from end to end in a half hour.

Other advantages of the new method include the fact that it will clean any standard bend on a sewer pipe. We have cleaned out sand, walnut shells, leaves, and almost every other imaginable form of rubbish—CATER A. GIEBEL, *Los Angeles, Calif.*

Storing Material On Skids

Manufacturers of food products can often obtain a double service from the system of handling and storage of raw materials which uses lift-trucks and skid platforms.

In this method of handling, the material is piled on the skid platforms as it is unloaded from freight cars or trucks. These skid platforms are then taken into the plant and the material remains on them during storage. The reason for doing this is that, when the materials are needed, they can be taken out of storage by the lift truck, without any additional manual labor.

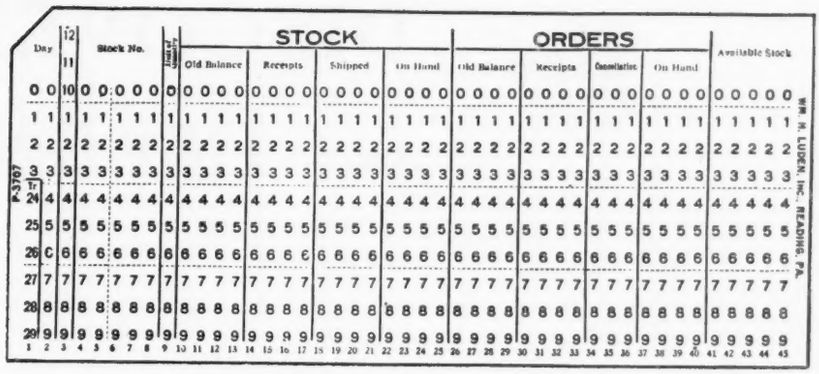
Many raw materials and ingredients used in the food industries are subject to attack during storage by rats, mice, insect pests and molds. One of the best methods of avoiding such damage is to keep the material off the floor and away from the walls. Another good practice is to have material piled in storage rooms so that dry, clean air can circulate over, around and under it.

Both of these advantages are realized by the method of handling and storage which uses skid platforms.

Speeds Stock Control

AN ACCOUNTING system that coordinates perpetual inventory and stock control with fiscal and production accounting has been developed by the Luden Corporation, Reading, Pa.

All data are recorded on cards and are indicated by punching the cards according to a numerical code. Each card represents a transaction affecting the inventory and stock control records. Obviously, many thousands of these cards are placed on file, and yet the accumulated data from any number of these cards may be transferred to columnar sheets in a few minutes through the use of mechanical sorting and tabulating machines.



Punchcard used in automatic system which speeds stock control and coordinates it with fiscal and production accounting.

Five colors of cards are used to record changes in the inventory. The color of the card distinguishes the nature of the record. Otherwise all cards are alike.

A salmon colored card is used to record the daily production that has been transferred to finished stock. A separate card is used for each stock number or commodity. The production figures for this card are derived from the daily work cards, one of which must be sent to the office each day for each employee, showing hours worked and units produced. The cards form the basis for the daily production and efficiency record, from which the payroll is written.

It is a simple process to obtain the production totals of each commodity from the daily work cards. Assuming that 500 of these cards have been received in the office to cover a certain day's operations, the cards are then perforated on an electrical punching machine to indicate the data written on them. They are then taken to a sorting machine and separated into stacks according to stock numbers of commodities.

The cards pass through the sorting machine at the rate of 400 per minute and are automatically stacked into a series of piles, each pile containing cards of the same stock number. If there are twenty different stock numbers in production, there will be twenty separate stacks.

The total production represented by each stack of cards is obtained by running them through a mechanical tabulator. As the cards pass through this machine at the rate of 200 per minute the perforations are converted into figures and transferred to a columnar sheet. An adding device accumulates the amounts and after all cards of one series have been entered the machine automatically prints the total daily production of that commodity. It is this total that is entered on a salmon colored control card.

A brown card is used to record orders received. A separate card is used for each stock number, listing the daily total of orders for that commodity.

Pink cards are used for cancellations. Daily totals of cancellations are entered in the same manner as orders.

Green cards indicate shipments or withdrawals from stock. This information is taken from the sales cards, one of which is prepared for each item from stock. After the sales cards have been sorted and tabulated the totals of the various stock numbers are entered on green cards.

A buff colored card is known as the inventory master or stock control record. Each stock number requires the use of a separate inventory card. The date is listed first, followed by the stock number and the old balance. This old balance is the inventory figure of the previous day which is transferred from the previous day's card.

Additions to stock are then listed. This is the total production placed in finished stock as shown by the salmon colored card. The quantities shipped, taken from the green cards, are then entered. Adding the old balance to the additions to stock and deducting from that total the shipments made indicates the quantity on hand, and this amount is carried forward as the balance of stock on hand.

In addition to the figures showing stock on hand the system also provides a method to indicate the available stock after making deductions for unfilled orders. The total of cancellations is deducted from the total of unfilled orders, showing the net amount of goods still to be shipped. This is then deducted from stock on hand giving the actual figures of stock available for shipment after all orders have been filled.—R. H. BUTZ, *Allentown, Pa.*

THE PLANT NOTE BOOK

New DISCOVERIES *and* INVENTIONS

One More Reason for Rigid Plant Control

A CURIOUS form of spoilage in the form of swelled cans of "roast beef" is reported here. Curious because the trouble occurred only on the night shift, and still more curious because the cans were swells as soon as they were processed and cooled. Another peculiarity was that the gas in the cans was mainly hydrogen. And stranger yet, the contents of the swelled cans were found to be normal. Also they were sterile.

A long study revealed that the trouble probably arose from *Clostridium welchii*. Back of that trouble there was probably improper cleaning of handling equipment at the slaughter house plus delays in handling the cans between the vacuum closing machine and the retorts. Fortunately no public health problem is involved.

Digested from "Isolation and Identification of an Anaerobic Organism Producing Gas in Boiled Beef" by L. S. McClung and E. Wheaton. *Food Research*, 1, 307, 1936.

Color in Canned Vegetables

EVERY CANNER knows how hard it is to retain the attractive green color of vegetables. And it is no consolation to be told that the cause of off-color appearance is merely the extreme heat sensitivity of chlorophyll, the green pigment of plants. Knowing the fact, without undue curiosity about the cause, many canners have tried to find out how to cook and sterilize in such a way that the chlorophyll is not destroyed. There are expedients which help in this direction. But no trick of the trade is known whereby spinach, for example, can be subjected to the cooking and sterilizing temperature and yet be saved from the natural consequences of such treatment.

The obvious answer has been artificial coloring. And of all the colors conceived to date, copper sulphate leads the list. Copper greening immediately lays the canner open to suspicion of fraudulent practice, though it is well established that there is no danger of poisoning from properly greened products. Moreover, it is a peculiar fact that the public is saved from unscrupulous exploitation because, only fresh, green material takes kindly to copper greening. The stale, off-color, inferior vegetables, which some might like to can and sell as quality products, simply do not come out with the quality appearance. Thus fraudulent practice defeats itself.

Copper greening requires skill and care, with particular pains not to use too much copper sulphate. Otherwise, the canner will have the double difficulty of unsatisfactory results and trouble with the food and drugs officials.

Digested from "Greening Canned Vegetables and Fruits, and Methods of Detection," by Dr. Serger and G. Lüchow. *Chemiker-Zeitung*, 60, 762–764, 1936. (Published in Germany.)

Dry Ice Keeps Bread Fresh

FOOD MANUFACTURERS can do many things with solid CO_2, popularly referred to as dry ice. Bakers can chill bread rapidly to 20 deg. F. to stop drying and prevent starch granules from reverting to their original form. This keeps the bread fresh. And at the same low temperature, stored grain and many food products can be kept from molding.

In the form of carbon-dioxide snow, dry ice can actually be beaten into certain types of frozen desserts. And food chillers can be used in which excessive cold is avoided by transmitting the refrigerating effect through metal over distances depending on the effect desired. Dry ice is one of the best freezing mediums for making ices and other confections frozen on sticks. The extremely low temperature readily gives the needed hardening effect.

With food products which require refrigeration in transport, there are attractive advantages in the use of dry ice. This has been demonstrated in the distribution of ice cream. This use of the refrigerant is meeting with especial favor in England, Italy and America.

Digested from "New Uses for Dry Ice," by F. Link, and "Containers for Dry Ice," by M. Hufschmidt. *Angewandte Chemie* 49, 656, 1936. (Published in Germany.)

Cider Vinegar by Gelatine Method

BETTER bouquet, higher acidity, less mother-of-vinegar and lower production costs than usual in quick processes is claimed for the vinegar produced by a method described in U.S. Patent No. 2,057,144.

The raw material is hard cider or sweet cider made hard by warming the apple juice to 80-85 deg. F. and adding 1 lb. of compressed yeast to 5,000 gal. of juice; fermentation is carried out at 70 deg. F. for two to three weeks.

Fermentation is followed by filtration and/or pasteurization, preliminary to seeding with selected acetic bacteria, suspended in a vinegar solution of gelatine, agar-agar, isinglass or similar colloidal substances. One gram of edible gelatine dissolved in 160 c.c. of new vinegar at 90 deg. F. and fully impregnated with the bacteria is sufficient to culture 8 gal. of hard cider.

After culturing, the cider is kept between 70 to 85 deg. F., with or without continuous or intermittent exposure to air or oxygen. During the early part of the acid-forming period only a light film of mother of vinegar forms on surface. Upon stirring this film breaks up to give a clear vinegar, high in acidity and full in bouquet at the end of 60 days.

The colloid content of the culture is thought to provide an infinite number of focal points for the bacterial action upon the alcohol and to act as clarifying agent to carry the suspended impurities to the bottom of the vat as sediment.

Granted Oct. 13 to Eugene F. Grab this patent has been assigned to Food and Fruit Industries, Winchester, Va.

Wrapping In Black Paper Caused Loss of Vitamin C

BETWEEN one-fourth and one-half of the ascorbic acid (Vitamin C) content of home canned tomatoes stored at ordinary room temperature may be lost before they are consumed. As a result of both canning and storage for six months in tin containers, tomatoes lost 25 per cent and juice lost 21 per cent of the ascorbic acid. In glass containers tomatoes lost 31 per cent and juice lost 45 per cent. Wrapping the glass containers with black photographic paper to keep out the light did not help to save the vitamins. On the contrary, it *increased* the loss from tomatoes by 13 per cent and from the juice by 10 per cent. This unexpected result suggests that perhaps heat rather than light brings about the storage losses in glass.

Digested from "Effect of Home Canning and Storage on Absorbic Acid Content of Tomatoes," by Daniel and Rutherford, *Food Research*, 1, 341, 1936.

Darkening of Apricots Still Unexplained

THE TRUE explanation of the causes of the blackening of dried apricots in storage is still to be discovered. In time, apricots become nearly black. This color change does not occur until the SO_2 content goes below a critical value that is dependent on maturity, moisture content, composition and previous treatment.

This investigation attacked the problem on the theory that the color change was due to a slow combination of sugars and nitrogenous substances in the apricot to give a dark color. But the succession of color changes occured without revealing any conclusion except that it is doubtful if the soluble nitrogenous substances or the sugars are involved in the darkening.

Digested from "A Note on the Nitrogenous Constituents of Dried Apricots During Browning," by Clifford L. Bedford. *Food Research*, 1, 337, 1936.

Ultraviolet Exposes Olive Oil

ULTRAVIOLET LIGHT, the light which cannot be seen but reveals itself in peculiar chemical effects, is absorbed in different ways by all transparent substances. The manner of this absorption of invisible light is so characteristic that it can be used to give evidence of slight changes in composition. So it is that olive oil is made to tell its own story to the skilled observer. Ultraviolet light is passed through a layer of the oil. The spectrum which results is made visible to the human eye. And the record discloses with complete certainty whether the sample is virgin oil, extracted or pressed, raw or refined, pure or adulterated, fresh or rancid.

So the detective of the oil laboratory, whether he represents producer or consumer, can quickly characterize and evaluate a sample and bring to light any accidental or fraudulent inferiority.

The reliability of the findings has been checked with painstaking care against the known facts supplied by chemical analysis, by exact knowledge of the origin and previous history of samples and by systematic intentional changes of composition.

Digested from "Ultraviolet Absorption of Olive Oils," by H. Kringstad. *Angewandte Chemie* 49, 423, 1936. (Published in Germany.)

Sterlizing Fruit-Flavored Drinks

TRUENESS of flavor is the measure of success in the manufacture of fruit-flavored beverages.

Sterilization of these beverages without impairment of flavor has been the obstacle to realization of complete success. Addition of chemical preservatives gives a foreign flavor and involves label complications. Pasteurization of beverage in containers involves need for special equipment and problem of reaching sterilization temperature at center of container without overheating at container walls with injury to color and flavor of beverage.

Without the addition of expensive and extensive equipment or injury to flavor these fruit-flavored beverages may be sterilized by procedure covered in U.S. Patent No. 2,054,494, granted Sept. 15 to John A. Bruce, Tampa, Fla.

In accordance with this method the volatile flavoring materials such as fruit juices and fermentable ingredients such as sugar syrup are added at room or lower temperatures to clean sterile bottles or cans. Other ingredients such as water and coloring, if used, are run in at sufficiently high temperature to raise temperature of entire beverage mixture to pasteurization level. The container is immediately closed with or without carbonation and moved along to a simple agitating device such as a 360 deg. twist conveyor which mixes thoroughly the heated and unheated contents of the container. The twist conveyor may be enclosed in a steam box or hot water jacket which will assure keeping contents of container at sterilizing temperature for a safe length of time and without use of temperatures high enough to caramelize the sugar or materially change flavor of fruit juices content.

Recommended method of heating the ingredient water is to have it flow through a coil in an automatically temperature-controlled steam box or water bath. This coil delivers the heated water directly to a conventional filler and capping or closing machine.

New Way to Clarify Fruit Juices

CLOUDNESS in fruit juices, extracts, wines and other liquid products is a defect which is sometimes astonishingly persistent.

A new clarification agent is described in Austrian Patent 146,503, granted July 10, 1936 to Interessen Gemeinschaft Farbenindustrie A.-G. To make this clarifier, natural proteins which are not soluble in water are partially decomposed with the aid of a particular mold (called *Aspergillus japonicus*) which has been found especially useful for this purpose. In a properly selected nutrient medium, as disclosed in the patent, this mold decomposes the proteins to form water-soluble products, but does not carry the decomposition too far. The products are mixed with natural enzymes, selected for their specific effects on the substances which cause cloudiness; the mixture is dissolved in water, or added directly to the cloudy juice or extract. Clear, sparkling liquids result, which are attractive to the eye as well as the palate.

Time Savers For Busy Men

This is our own readers digest of scientific discoveries and patents and new ideas. You may find here a new hook on which to hang a sales promotion story. Or you may learn of a better way to operate. Or, alas, you may find that somebody has gotten a patent that will make it tougher going for you in the future.

Brazil Nuts Contain Poison

THERE IS POISON in the kernels of Brazil nuts—enough to endanger anyone partaking liberally of them. This poison is barium, and the shell contain even more of it than the kernels. But all the barium may be removed from the meat of the nuts by extraction with water mildly acidified with hydrochloric acid. Extraction with ether or with hot alcohol removes the edible oil, but leaves the barium in the insoluble extraction residue.

While the poisoning hazard is small under present conditions, it would become serious were there to be a large increase in the use of Brazil nuts as food. It would then be necessary to use some such precaution as extraction with dilute hydrochloric acid.

Brazils are not ordinarily eaten in quantity. Even countries which need to import fats and fatty foods buy a comparatively small amount of the nuts. There are reasons. The shelled nuts quickly become rancid, and they are highly susceptible to mold. So, unless an effective but inexpensive means can be found for stabilizing the nuts against rancidity and protecting them against mold, no country is expected, however scant its edible oil supply, to import a large amount of Brazils.

Digested from "Barium Content of Brazil Nuts," by Kurt Wagner, *Journal für Praktische Chemie*, 147, 110–112, 1936. (Published in Germany.)

Keeps Milk Fresh Five Months

RAW MILK, pasteurized milk and pasteurized cream are kept fresh for periods up to five months by the Hofius process. The milk or cream is held in a container under a pressure of about 150 lb. per sq.in. of oxygen, and at a temperature of 4-8 deg. C. (39-46 deg. F.). Bacteria increased from 70,000 to 2,500,000 per c.c. in one test lasting 44 days, but the taste remained good. In other tests at 4-5 deg. C., raw milk and pasteurized cream remained fresh for five months, but pasteurized milk remained fresh slightly less than three months.

This report, though meager, comes from Dr. A. Van Raalte of the Amsterdam Municipal Laboratories (Holland), and has no illustrations or diagrams of the equipment.

Digested from "Still Fresh After Five Months," by A. Van Raalte. *Food Manufacture*, 11,359, 1936. Published in England.

Cheese Prevents Cataracts — In Rats

LACTOFLAVIN, the vitamin that prevents the formation of cataract on the eyes of rats, is probably the chemical name for Vitamin G. Deprive a rat of lactoflavin and it loses hair, fails to grow and develops cataract. What lactoflavin has to do with human cataract is not yet known.

Feeding cheese to rats in these tests on rats indicates that American cheese (cheddar type, purchased on the market) contained eight micrograms of lactoflavin per gram, compared to six in Swiss cheese and 1.4 in cream cheese.

Digested from "The Cataract-Preventive Vitamin (Flavin) In Cheese," by Day and Darby, *Food Research*, 1, 349, 1936.

Olive Oil Extracted Without Drying!

IT IS an old and settled belief that olives, or press cake from the crushing mills, must be dried before being extracted with volatile solvents. With drying costs to figure in, and the inevitable loss in quality by darkening of the oil, the extraction process was in no position to compete with pressing for the production of high grade edible oil from raw olives.

But men who dared to question the tradition about drying before extraction found they could get a better yield of oil from their extractors than the best presses would give by using fresh olives which have not seen a dryer. Moreover, they found that the extracted oil was easily refined. It required no neutralization and only a mild bleaching and deodorizing to yield oil of a fine table quality. Best of all, the production cost was low and there was a good profit for the producer, especially in exporting the extracted oil alone or blended with pressed oil. Light gasoline and carbon disulphide are the two preferred solvents for this process; trichloro-ethylene (commonly called "tri") is an efficient solvent, but it gives an oil which is rather more difficult to bleach than the oils extracted with the other solvents.

Digested from "A New Process for Producing Oil from Olives," by C. Kerkhoven. *Oele, Fette, Wachse*, No. 9, 7-8, June, 1936. (Published in Austria.)

"No Time" Beer

SUBSTITUTION of mechanical treatment for biochemical lagering makes a bid to speed up the aging of beer.

As normally practiced, the aging of beer is a drawn out process requiring from three to six months and a carefully selected range of temperatures between which the beer is held unmolested in closed storage tanks. During this period green beer containing much suspended material and having a cloudy appearance undergoes a secondary fermentation as well as a clarifying process. Its complex constituents break down into simpler and more completely soluble substances. Suspended yeasts and flocculent proteins settle out and the beer takes on a brilliant, sparkling, clear appearance.

According to the method disclosed in U.S. Patent No. 2,057,352 granted Oct. 13 to Cornelius V. Werner, Richmond Hill, N. Y., and Carl Schreiner, Brooklyn, N. Y., full aging is obtained without any storage period. Vigorous handling through a pressure homogenizer or colloid mill does the trick. It is further claimed that this mechanical treatment leaves in the beer a higher percentage of flavoring and other extract constituents which ordinarily filter or settle out and that there is an increased yield of beer from a given quantity of malt, hops and yeast.

The procedure followed consists of keeping the green beer in a state of continuous agitation following the standard primary fermentation; forcing the green beer under pressure through a homogenizer or colloid mill to break up and fully disperse throughout the beer all undissolved particles and unevenly dispersed extracts; and finally passing the beer through a filter or clarifier with or without a short preliminary settling or flocculation period.

All steps are carried out under controlled temperature and atmospheric conditions suitable for the normal handling of beer. The patent is assigned to Charles J. Werner, Richmond Hill, Long Island, N. Y. as trustee.

Vitamins Made More Pure

IMPORTANT contributions to the knowledge of certain vitamins have been made at Massachusetts Institute of Technology by Prof. N. A. Milas and his colleagues. Natural vitamins A and D have been separated from each other and from associated substances. And concentrates of 3,000,000 international units of A per gram and 10,000,000 international units of D per gram have been obtained from the liver oil of the albacore.

The 3,000,000-unit concentrate of vitamin A was obtained by fractionations at -78 deg. C. (-108 deg. F.) in the absence of oxygen. It is believed to be the nearest approach to pure vitamin A from natural sources known to science. But it still has associated with it about 0.03 per cent of vitamin D, although it is hoped that this may be removed by additional fractionations. Progress in further purifying the 10,000,000-D fraction is being made with the aid of chromatographic absorption and fractional crystallization of solid derivatives of this vitamin. Physical methods for estimation of vitamin D in this relatively pure state have been developed.

Production of water-soluble derivatives of these normally fat-soluble vitamins has been accomplished, and the necessary biological tests to demonstrate their effectiveness and under way. And a new type of optical instrument has been developed for measuring objectively the strength of vitamin A concentrates. This is called the photoelectric vitameter (*Tech. Engineering News*, October, 1936).

The work at the Institute substantiates the generally accepted view that the vitamin D present in fish liver oils is not identical with that produced by irradiation of ergosterol. This strengthens the belief that vitamin D, so-called, exists in many forms.

Continuous Stirring Permits Pasteurization at Lower Temperatures

PASTEURIZATION as used in wine and grape juice manufacture has two different functions. For grape juice manufacture it means a low-temperature treatment to kill all the organisms that might be in the juice. But for wine making it means killing off the majority of organisms in the must (grape juice for fermentation) so that the yeast which carries out the desired fermenting job has the right of way and predominates.

The lowest temperature that can be safely used for pasteurizing must is necessarily one that can be used without conferring a cooked flavor on the wine. Juice from different grape varieties has different characteristics all of which affect the permissible pasteurizing temperatures.

In this study the problem of foam proved to be comparable to foam troubles in dairy pasteurization where it is necessary to take special precautions to heat the foam by live steam. Although there is not much material in a foam, it can act as a contaminant for the pasteurized liquid underneath because the air bubbles act as a good heat insulation. Live steam seems to be the only way to heat a foam.

Killing of organisms in grape must began at from 105 deg. F. to 120 deg. F., while the majority were killed in all juices before 140 to 145 deg. F. was reached. In the juice of one variety, Concord, the killing effect was sufficient at 132 deg. F.

All these tests were made in small batches to simulate open kettle commercial methods. Continuous stirring during pasteurization was helpful. All organisms died at 152 deg. F. when the must was stirred but they were able to survive 170 deg. F. when the juice was pasteurized without stirring.

Digested from "Preservation of Grape Juice. IV. Pasteurization of Juices or Musts Prepared from Several Varieties of Grapes," by Pederson, Beavens and Goresline. *Food Research*, 1, 325, 1936.

What's New IN EQUIPMENT

Fruit Feeder

FOR USE with the larger sizes of Vogt Instant Freezers, Cherry-Burrell Corp., 427 Randolph St., Chicago, Ill., has developed their "Senior" Model fruit feeder. This device is for the purpose of incorporating fruits and nuts in ice cream as it is discharged from the freezer to which it is directly connected. The feeder is similar in design to smaller feeders made by the same company.

Tomato Pulp Screen

GREAT WESTERN Manufacturing Company, Leavenworth, Kan., has developed a screening machine for use in tomato juice processing. This screen is of a type unusual in the food industries, being similar to screens used in the chemical and paint industries.

The machine consists of a circular shaped, 20 in. diameter, screen of Monel metal wire cloth. It is set horizontally in a suspended frame. This frame is equipped with an electric motor and a vibrating shaft which imparts a vibratory motion to the screen.

The screen is known as Type V. It will handle 1,000 gal. per hour or more of tomato juice through a 20 mesh.

Laboratory Oven

DESPATCH Oven Co., 622 Ninth St., S. E., Minneapolis, Minn., has placed on the market a line of electrically heated ovens for the food research laboratory. These ovens, used for drying, staleness tests, aging tests and similar purposes, come in two types, with sizes from 2,200 to 4,800 watts in each type. The vertical flow, forced draft oven has a top mounted motor connected to a fan within the oven. By means of the fan, a downward forced draft is created, to circulate air through the material. Through a vent at the bottom, equipped with adjustable dampers, the amount of air leaving the oven is regulated.

The cross-flow, forced draft oven has a different system of air circulating and recirculating, providing for rapid air flow from one side of the oven to the other. Uniformity of temperature throughout the oven is assured. On each side are adjustable louvers to adapt the flow to varying needs. Air travel is fast enough to provide uniformity and proper distribution of heated air without disturbing materials treated.

Imprinting Box Ends

R. HOE & Co., 910 East 138 St., New York, N. Y., have developed a new high speed machine for imprinting the ends of boxes or shipping containers in the food manufacturer's plant. It operates at speeds up to 3,000 box ends per hour.

In operation, the boxes, either empty or loaded, are stacked in a feeding hopper. After printing they are automatically restacked in a delivery hopper. The printing head is adjustable for a variety of positions. Practically any type face can be used. It is claimed that the printed result equals the finest printed label. And with this equipment it is possible to print the entire box end in one operation.

Boxes can be handled from $\frac{3}{8}$ in. to $2\frac{1}{2}$ in. deep, from $5\frac{1}{2}$ in. to 9 in. wide, and from 6 in. to 14 in. long. The machine occupies a 20x25½ in. floor space and uses a $\frac{1}{3}$ hp. motor.

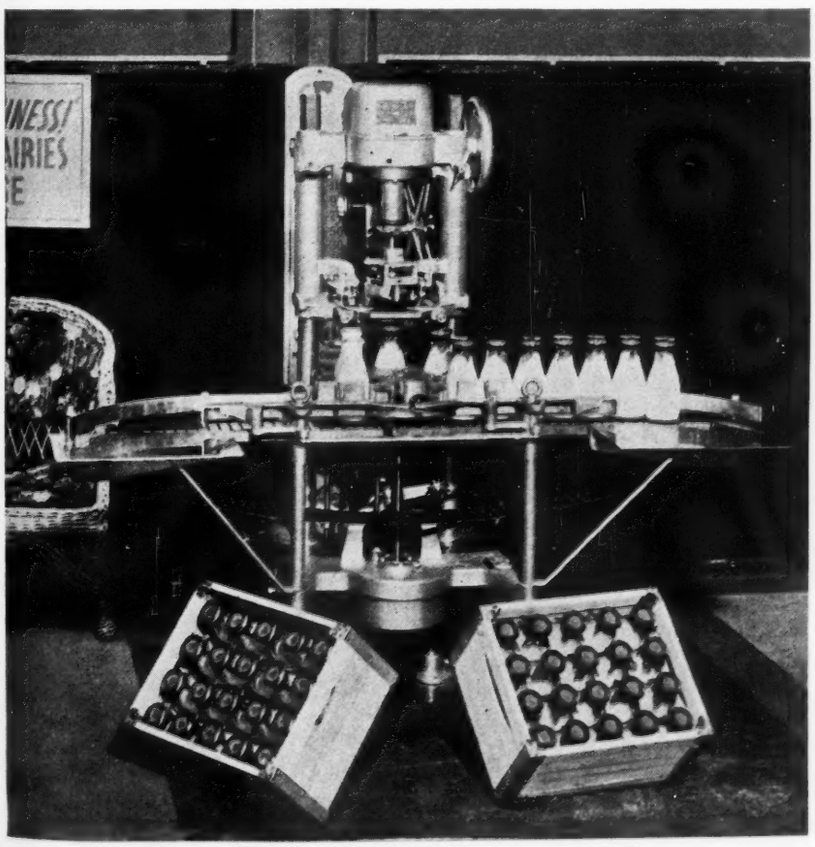
Milk Bottle Hooders

MACHINES of new design, for placing transparent cellulose sheeting hoods on milk bottles and other containers, were recently brought out by Package Machinery Co., Springfield, Mass. There are two models, BH-5, a fully automatic machine; and BH-4, a semi-automatic machine.

The fully automatic model is shown in the photograph. Its speed is 35 per minute. It is designed to hook up with the discharge of a filling machine, with one man attending both machines.

The semi-automatic model has a speed of 27 per minute. Bottles are fed to it and removed by hand. All other operations are automatic.

Both machines accommodate the customary range of bottle sizes. Both are fed with hood and banding material in roll form.



Milk bottle hooder for transparent cellulose hoods

Hydraulic Lift Truck

FOUR inches of additional elevation is now obtained by Lyon Iron Works, Greene, N. Y., for its standard factory hydraulic lift trucks. The lift has been increased from 6 in. to 10 in. by means of a top frame on the platform, actuated by a lever arrangement.

Milk Bottle Case Washer

A NEW case washer, Model 36, is being made by Cherry-Burrell Corp., 427 West Randolph St., Chicago, Ill. This washer is designed to operate in connection with soaker type bottle washers of practically any make. It fits into any case conveyor line, taking the cases lengthwise. One size only is available, with a capacity of eight cases per minute.

Portable Food Mixers

MIXERS of the portable type for food plant use are now being made by Eastern Engineering Co., 45 Fox St., New Haven, Conn. These mixers embody the "Turbo-Thrust" principle of design, said to be new and effective. In it the propeller is designed to combine two mixing functions. A thrust action creates a strong current toward the bottom of the mixing tank. This keeps suspended or undissolved matter in circulation. At the same time a "turbo" action produces violent agitation, to effect thorough mixing.

This mixer comes in several sizes. Model 11 uses a ¼ hp. motor at 1,725 r.p.m. and a 4-in. three-blade propeller, and is used with quantities up to 200 gal.

Exhaust Box Conveyor

CANNERS faced with the problem of moving large size cans or containers through an exhaust box will be interested in a flexible steel chain conveyor developed for this purpose by Standard Conveyor Co., North St. Paul, Minn.

As shown in the photo, the cans are run in single file through the box, while resting on the chain and held in position by guide rails at the sides. The flexibility of the chain is such that several reverse turns can be made with small space, permitting complete air exhaustion without over extending the dimensions of the box. Also, the chain takes filled cans from the filler and delivers cans to the closing machine without the usual necessity of operators at each end of the exhaust box.

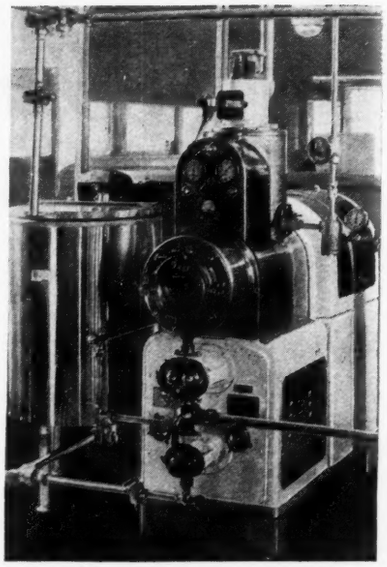
With this conveyor, greater speed through the exhaust is said to be possible, steam jets for heating taking the place of hot water. Speed is as high as 20 No. 10 cans per minute.

The chain used is flexible in any direction. It is supplied in corrosion resistant alloys to permit the maximum of cleanliness.

Ice Cream Flavor Mixer

CREAMERY Package Manufacturing Company, 1243 W. Washington Blvd., Chicago, Ill. is now offering a Flavor Mixer for use as an accessory with its continuous ice cream freezer. This is a tank, equipped with a mixer, for mixing, blending, and holding fruit, nut and candy flavored ice cream mixes prior to freezing. It is designed for rapid cleaning to permit easy changes from one flavor to another.

The lining is of stainless steel, with welded seams ground and polished. Exterior is of heavy gage white enameled copper bearing steel, or polished stainless steel if desired. Corkboard insulation is used. A geared head motor drives a two-blade stainless steel agitator, which mixes and holds in suspension the particles of fruit, nuts or candy.



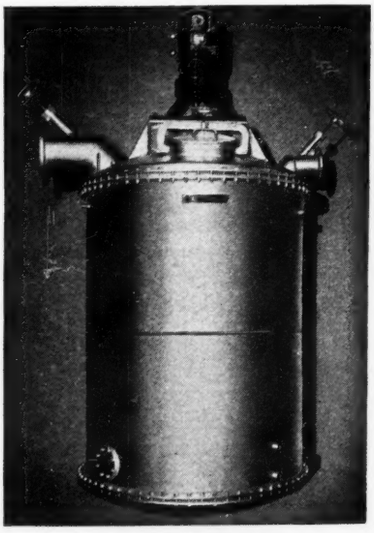
A 50 gal. Flavor Mixer connected to a 150 gal. per hour Creamery Package continuous freezer.

Hand Chain Hoists

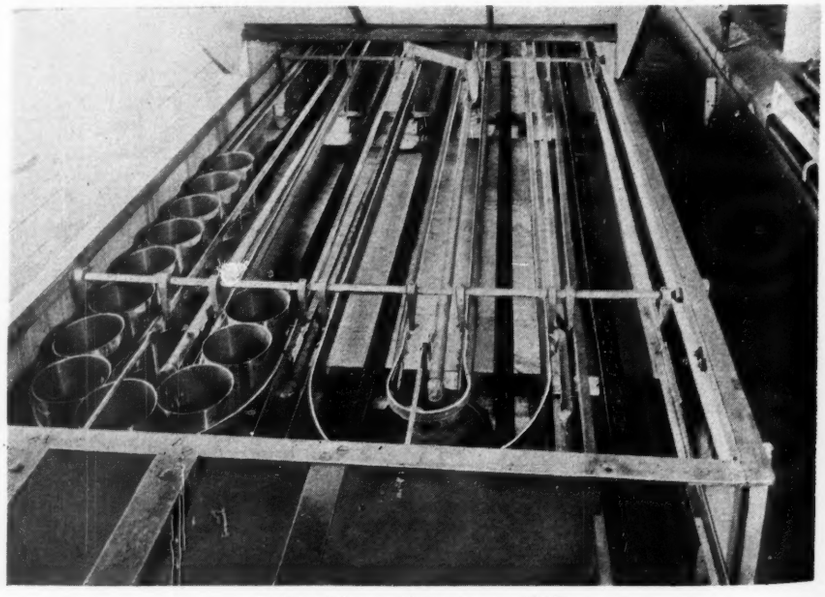
CONCO Engineering Works, 815 Jefferson St., Mendota, Ill., has introduced a new line of spur geared, hand chain hoists, for which it is claimed that the use of precision ball bearings and other improvements lessens the energy required to move a given load in a given time. The hoists are designed for material handling operations in any industry. Regular sizes in capacities from 500 lb. to 6 tons are available.

Direct Fired Kettle

A NEW TYPE of direct fired kettle, built of stainless steel, aluminum, or alloy metals, has been developed by Patterson Foundry & Machine Company, East Liverpool, Ohio. This kettle has a removable, dished bottom, special type cone overflow and inlet valves, siphon

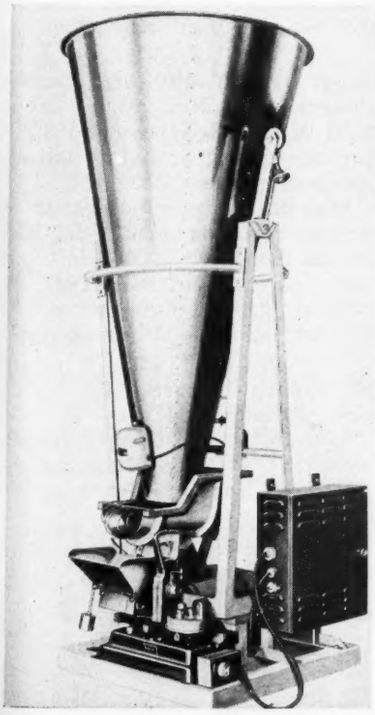


Direct fired kettle.



Exhaust box with conveyor chain

Automatic control instrument without recording chart.



Automatic precision batch weigher.

discharge, and vacuum tight manhole. It is designed for internal vacuum operation. Agitation is provided, with gearless speed reduction and either paddle or turbine type stirrers.

Pneumatic-Type Controller

THE BRISTOL CO., Waterbury, Conn., has developed a new line of pneumatic-type controllers for temperature, pressure and liquid level, called the Model 90. This instrument is for those applications where a chart record is not desired, or where recording instruments are already installed.

Batch Weighing Machine

AN automatic precision batch weighing machine for use with dry food ingredients, such as flour or cereals, in batching or filling operations, has been developed by Syntron Co., 400 No. Lexington Ave., Pittsburgh, Pa.

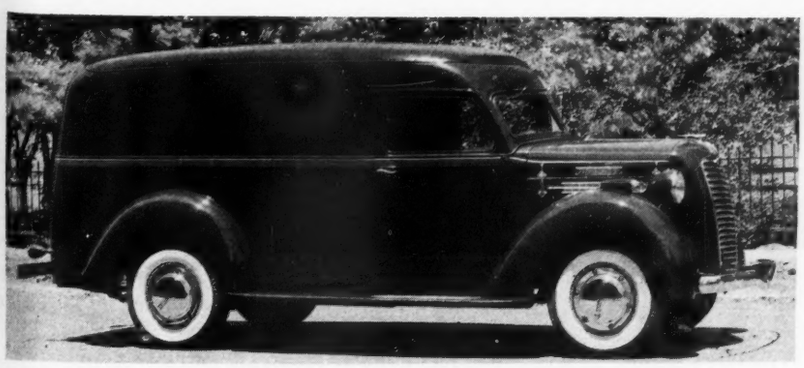
The photograph shows this machine with the weighing hopper mounted on an even balance type of scale, and the weighing hopper fed from the main supply hopper through a vibratory feeder conveyor.

The scale has two electrical controls, one for cutting out the high speed feed from the conveyor when about 80 per cent of the batch is weighed, and the other for stopping the slow dribble feed of the conveyor when the exact weight is reached. Then the machine automatically dumps the weigh hopper, and the operation is repeated.

This machine is available in a range of sizes to suit batch requirements, and with three different types of control. One is an automatic, electrically timed continuous repeating mechanism that will weigh out batches and dump them at a definite rate per minute. Another dumps the scale hopper automatically as soon as the batch comes to weight, repeating the procedure indefinitely. The third allows for manual dumping of the hopper after inspection for weight.

Delivery Truck

DIAMOND T MOTOR CAR CO., 4517 West 26th St., Chicago, Ill., are now distributing a ¾-ton, heavy duty delivery truck, designated Model 80. The wheelbase is 119 in. Base price for the standard chassis is $525. The lines are of modern, streamline design. Either standard cabs or de luxe cabs are available, as desired.



Diamond T 3/4-Ton Delivery Truck.

Lift Jack Trucking Unit

A NEW SYSTEM of hand truck and skid platform materials handling and storage has been developed by All Steel Welded Truck Corp., Rockford, Ill. This method uses a platform with skids on one end and two wheels, one at each corner, at the other end. In the center of the end that is mounted on skids, a lift jack engaging pin is attached.

The lift jack unit itself consists of a reinforced steel housing inclosing a fulcrum lift mechanism with a lift power of 6,000 lb. when a force of 76 lb. is exerted on the handle. This lift mechanism is mounted on an axle having two wheels. It is equipped with a handle that serves both for operating the jack and for hauling the load.

In operation, the lift jack unit is backed under the pin on a loaded platform. By operating the handle, the jack is caused to work. This first engages the pin and then lifts the skid end of the platform slightly. Then the two wheels on the other end of the platform and the two wheels on the lift jack unit constitute the wheels of a four-wheeled truck and the load can be easily moved. In steering, the engaging pin on the platform and its socket on the lift jack provide a pivot that permits turning.

Glass Insulation

FIBROUS GLASS is a recently developed form of glass insulation manufactured by Corning Glass Works, Corning, N. Y. The product is a well-felted, flexible mass resembling cotton batting in appearance and feel.

Fibrous glass fibers are manufactured in diameters ranging from one-seventh to one-fiftieth the size of a human hair. The fibers are long, and this length combined with the natural resilience of the material, gives a lightweight bat or felt that does not settle, even when vibration is severe. Weight of the bat, depending on composition, is from 1¼ to 1½ lb. per cu.ft. as used for building insulation. In industrial service, the material may be compressed to greater density to operate at higher temperatures.

The thermal coefficient of the material is from 0.266 B.t.u. per sq.ft. per deg. F., per hour, per inch thickness at 70 deg. F. mean temperature and 1½ lb. per cu.ft. density, to about 0.60 at the higher temperatures ranges for which the material is recommended and 6 lb. density.

Being made from glass, the material has the same chemical inertness of glass, and is weather and vermin proof.

Just Off The Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

1. AGITATORS — Patterson Foundry & Machine Co. New bulletin illustrates and describes the "Unipower" agitator and agitator drive for use with food mixers and similar equipment.

2. CANNING PLANT EQUIPMENT—B. F. Goodrich Co. "Rubber Products For Canning Plants" is a new bulletin describing items of rubber made by this company, such as belt conveyors, hose, pipe, etc., for use in canning plants.

3. COLLOID MILLS — Eppenbach, Inc. Catalog 21 illustrates and describes the No. 1 laboratory colloid mill for premixing, grinding, cutting and homogenizing.

4. COLLOIDAL MIXER—Colloid Equipment Co. Leaflet describing a mixer of the colloidal type for making emulsions or intimately mixing pasty ingredients.

5. CONVEYERS—The Whitney Chain & Mfg. Co. Bulletin V-121 describes open mesh chain for use in belt type conveyors where a flat surface is desired and the open mesh permits air cooling.

6. COOKING KETTLES—International Nickel Co. A new bulletin describes the quick heat transfer qualities of cooking kettles made from pure nickel.

7. DRYING EQUIPMENT — Allis-Chalmers Manufacturing Co. Bulletin 1263 deals with dryers and coolers for use with cereals, soybeans and other food materials.

8. FILTERS—Oliver United Filters, Inc. Bulletin 122A, discusses the use of pressure filters for filtering wines, beers, ginger ales, fruit juices, and syrups.

9. FLOUR SIFTING EQUIPMENT—Read Machinery Co., Inc. A bulletin describes and illustrates the "3 in 1" weighing, sifting and aerating device made by this company for use with flour.

10. KETTLES—Patterson Foundry & Machine Co. Bulletin of electric heated and direct fired kettles for processing work, with and without built-in agitators.

11. KETTLES AND TANKS—The Duriron Co. Bulletin 157-B describes jacketed kettles, agitators, laboratory kettles and tanks made of Duriron.

12. MILK EVAPORATORS — Buffalo Foundry & Machine Co. New catalog describing and illustrating various types of stainless steel milk evaporating equipment.

13. MILK FILTER — Johnson & Johnson. Bulletin describing and illustrating the "Rapid-Flo" frigid filter for the cold filtering of milk, a method put forward to replace the present practice of hot pressure filtration.

14. MIXERS AND AGITATORS—Mixing Equipment Co. A new general catalog describes the "Lightin" line of mixing and agitating equipment for the food plant and for general purposes.

15. PACKING HOUSE EQUIPMENT—Cincinnati Butchers' Supply Corp. New leaflets describe cutters, meat loaf pan fillers, hashers, and rendering equipment.

16. PROCESSING EQUIPMENT—Edge Moor Iron Works. Bulletin 101 shows equipment of various metals, such as tanks, heaters, kettles and heat exchangers, fabricated by this company.

17. SPRAY WASHER EQUIPMENT—Link-Belt Co. Folder 1407 announces a non-clogging spray for use in washing fruit, vegetables and for similar purposes.

Plant Accessories and Supplies

18. OILERS—The Lunkenheimer Co. Eight page illustrated catalog of bottle oilers. Also Circular 595, describing the "Alvor" constant level oil control for ring oiled bearings.

19. PUMPS—Worthington Pump & Machinery Corp. New publications as follows: W-711-B3, Types AE and AF, horizontal, simplex, air and steam heating vacuum pumps; W-112-B4, Type DF horizontal, duplex, direct acting Underwriter fire pumps; W-321-B4B, Type DE, No. 4 and 5, Monobloc centrifugal pumps; W-102-B1A, Type TB, Horizontal, duplex piston pumps for general services up to 200 lb. pressures.

20. SAFETY DEVICE—The Bristol Company. Bulletin No. 457 describes the "Pyrotrol", an instrument recently developed as a safety device for use on gas fired ovens, to guard against pilot light failure.

Control Equipment

21. CANE JUICE CLARIFICATION—Leeds & Northrup Co. Bulletin 709-C describes the "Micromax" automatic pH control for use in the clarification of raw cane juice.

22. DAIRY CONTROL INSTRUMENTS—C. J. Tagliabue Mfg. Co. Catalog 1140 is a 28 page illustrated catalog of indicating and recording control instruments made by this company for use in the dairy industry.

23. STEAM FLOW MEASUREMENTS—The Foxboro Co. "Handbook of Steam Flow Measurement" by L. K. Spink, has been issued by this company as a reference for those having problems of steam flow to solve. It discusses the theory of such measurements and gives test routines.

G. L. Montgomery, Managing Editor, Food Industries, 330 W. 42nd St., New York, N. Y.

December, 1936

TO THE READER: Use this convenient form to order the bulletins you need.

Please obtain for me the bulletins indicated by the following numbers:.....

.....

Name.....

Title.....Address.....

Company.....

THEY'RE AFTER YOUR MARKET

These Companies Are Seeking a Bigger Share of the Total

▶ WINE IN TIN CANS not only has been officially recognized by American Can Co., but it is the subject of a test campaign by that concern. Sixteen New England markets are being attacked by newspaper ads of a quarter-page, or less, these appearing in sport sections every week or ten days. Featuring sweet wines only, the ads emphasize the "vacuum-sealed," "tamper-proof," "dark-storage" and "handiness" aspects of the cans. If the canned wine goes over in Yankeeland, that will make it as least as good as the New Deal.

▶ "SPEED COOKING" is a new appeal phrase by which Geo. A. Hormel & Co., Austin, Minn., is getting across one of the advantages of its soups. Hormel advertising stresses the part soup plays in the emergency meal of the modern missus. It also assures that Hormel soup offers a new way of preparing one or two "economy menus" a week.

▶ NO MORE PREMIUMS are to be used by bakers in New England. This decision was not made out of Yankee conservatism, but because the members of New England Bakers' Association feel it is a step in the direction of better and fairer business ethics. It will assure cleaner competition and more equitable profits, they say. Looks like a new deal for New England.

▶ IT IS TOO EARLY to determine the effectiveness of the sales drive which accompanied National Cheese Week, held last month. But figures on two previous years are available. The first cheese week was in 1933. During the week of the drive and the six following it, the entire 30,000,000-lb. surplus of cheese was put into consumption. Cheese week of the following year accounted for 20,000,000 lb.

▶ TUNE OUT THE PROGRAM if you are not engaged in retailing. That is what radio listeners are invited to do by Wm. Wrigley, Jr., Co., Chicago, in a program launched over CBS on, of all days, Friday, Nov. 13. The program is addressed to retailers, and it includes dramatizations of the professional experiences of a super-salesman.

▶ MEATS TOP THE MENU, or so reads the title of a 40-page meat recipe book prepared by National Live Stock and Meat Board, Chicago. Issued to retailers for holiday distribution to consumers, the cover of the book has space in which the dealer may print his name and secure himself some free advertising. To capitalize on the whims of women, the book contains instructions for reducing weight.

▶ MORE THAN EIGHT MILLION people will see the full-page advertisements in which Borden Sales Co. is dramatizing the "irresistible appetite appeal" of old-fashioned mince pie made from None Such Mince Meat. The ads will appear in the November, December and January issues of leading national magazines.

▶ DOUBLE YOUR MONEY BACK is the offer to consumers who don't like Flako Pie Crust. While nothing novel, this does make consumers think the product is good because it shows supreme confidence on the part of the manufacturer. The offer is being made in newspaper ads during a November-December drive by Flako Products Corp., New Brunswick, N. J. In addition to newspapers, the company is advertising in eight national magazines which appeal to women. The campaign will include more than 114,000,000 separate ads.

▶ $650,000 WILL BE SPENT by Florida Citrus Commission to advertise oranges, grapefruit and tangerines. The campaign will use 132 newspapers in 84 cities, as well as radio stations, street-car cards and trade publications. And so the battle goes on between Florida and California for the lion's share of citrus sales.

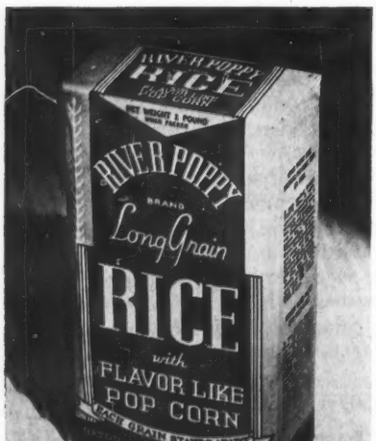
▶ LEST PEOPLE FORGET that Rear Admiral Richard E. Byrd ate "Phillips Delicious" foods in the shadow of the South Pole, more than 600 newspapers in nineteen states from Maine to Florida are retelling the story. These ads by Phillips Packing Co., Inc., show foods on the pantry shelf of the famous explorer.

▶ OUR FACE IS RED, too. Only it is not a preelection poll that worries us but a statement in this department last month that connected Calumet Baking Powder and a radio program promoting it with Standard Brands, Inc. Calumet is the product of General Foods.

AT THE CROSSROADS OF THE WORLD

Not only the seven million native New Yorkers, but people from all corners of the world will see this new electric spectacular mounted above Times Square by Planters Nut and Chocolate Co. The sign, which stands 55 ft. high, was officially lighted November 14.

New PACKAGES *and* PRODUCTS



Popcorn Rice

As OLD as China and as staple as the good earth, rice is one product which one thinks of as never changing. But it has been changed. Rice with a popcorn flavor has been put on the market by Baton Rouge (La.) Rice Mill, Inc. Used in the same dishes as ordinary rice, the new product appeals particularly to children because of its different taste, the Baton Rouge company reports. The carton for the rice is conservatively attractive and exemplifies effective use of highly readible lettering.

Spray-On Wrapper

INTENDED for the preservation of products which are difficult to wrap is a material developed by Beacon Laboratories, Inc., Wilmington, Del. Called Seal-O-Dip, it may be applied to such things as citrus fruits, eggs, bottle tops and preserving jars by spraying, dipping or painting. It is said to be transparent and to effect a moisture-proof and airtight seal.

52 Frosted Foods

QUICK-FROZEN foods, which got off to a rather slow start, are now gaining headway more rapidly. The latest impetus to this type of preservation comes with the distribution of 27 vegetable items, 20 fruits and 5 fruit juices by Honor Brand Frosted Foods Corp., New York. These 52 items have made their appearance along the Atlantic Coast and in the Mid-West.

Quick-freezing is not new to this firm. It has been distributing frosted foods in bulk to wholesale, institutional, restaurant and hotel trade since 1930. But marketing to retailers awaited development of a satisfactory consumer carton. This has been realized in the form of a printed, moisture-proofed carton combining eye appeal with product protection.

Honor Brand frosted foods are not frozen as a block. To take an example, a package of peas consists of either 1 lb. or 2½ lb. of loose, individual peas. The vegetables are frozen in shallow metal trays which hold a single layer. The company freezes a large share of its output itself, using principally the Murphy system (FOOD INDUSTRIES, November, 1936). Portable freezers are employed, these being moved into the farm areas at harvest time. Three plants furnish the bulk of the output. One is in the Pacific Northwest and the others in Virginia and Eastern Maryland.

Package is Premium

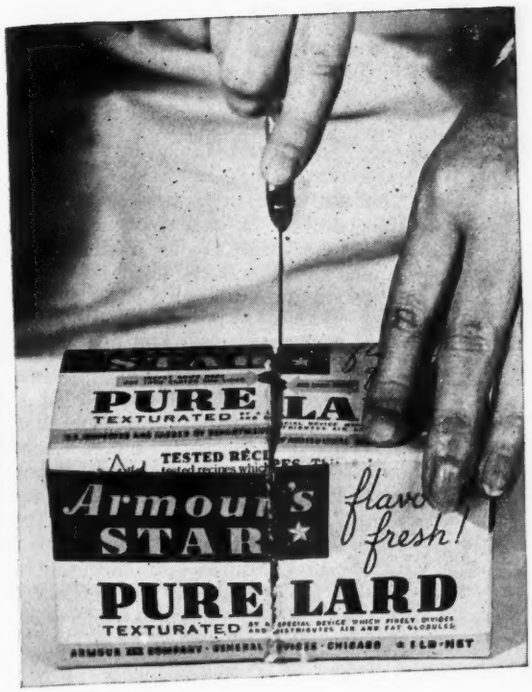
CAKE BOXES usually are thrown away when empty. But not the one put out by Larsen Baking Co., Brooklyn, N. Y., for its Christmas fruit-cake. It becomes a permanent serving tray. The first all-molded fruit-cake container, it consists of a black tray with a recess into which the cover fits snugly. The molded plastic not only makes an unusually attractive container, but it is light in weight and resists scratching, chipping and denting.

Two Meat Tenderizers

YOU don't have to use a sausage grinder to make cheap meat chewable now. Or so say two manufacturers of enzymatic meat tenderizers. The basic essence of each of these products is obtained from the papaya, a tropical fruit rich in papain, a substance capable of digesting protein materials. One of the products, "Delicia," is made by Delicia, Inc., Chicago. The other, "Tendra," by Tendra Kitchens, Cincinnati. Applied to meat before cooking, these preparations act in a few minutes. Aside from making meat tender, they are said to cut cooking time and reduce shrinkage.

Carton Measures Lard

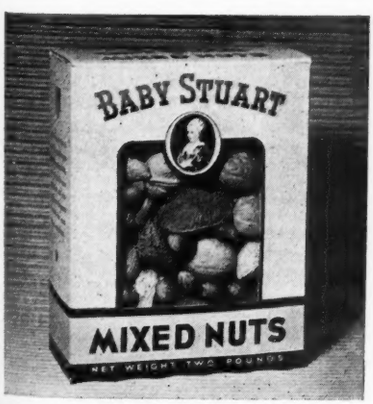
MEAT PACKERS tell consumers that lard makes the best shortening. But even so, it will not give proper results unless the amount used be measured with some de-



gree of accuracy. And to make this operation easier and less greasy, Armour & Co. has adopted a self-measuring carton. This package is perforated so that it may be cut in half in two directions. Cutting in crosswise gives two 1-cup portions. Then by splitting each half lengthwise, the housewife gets ½-cup amounts. The wrapper is so designed that the portions may be emptied into a mixing bowl without touching the lard. And the carton is so constructed that half a package can be reclosed. Armour packages its Texturated Vegetole in this type of carton, too.

Nuts Look Out Window

NUTS can be mixed in all sorts of proportions, and the wise consumer doesn't like to buy mixed nuts sight unseen. So if these nuts are to be packaged, the smart thing is to put them up in a transparent container. Sprague, Warner & Co., Chicago, is marketing them in a 2-lb. carton, but this carton is equipped with a transparent window. In addition to giving the consumer a handy package, the carton keeps the nuts in good condition and reduces weight loss from moisture evaporation. Furthermore, it makes possible effective mass display—something difficult with nuts in bulk—and saves the grocer time and trouble.



Cheaper But Better

NOT ONLY does the new three-color carton adopted by Bromaco Maraconi Corp. put up a better appearance than its four-color predecessor, but it is more effective for mass display. And with all that advantage, it saves the Brooklyn company the cost of one color.

Orange Juice in Beer Bottle

INFAMOUS for its ability to go off flavor quickly, orange juice apparently is being licked by food technologists. California Packing Corp., Libby, McNeill & Libby, Sussman Wormser & Co., Wellman Peck, Tree Sweet and Orange County Canners are packing it on an increasing scale. And now Mission Dry Corp., Los Angeles, has entered the field. This company is vacuum-packing the product in "Stubby" bottles for distribution through dairies and other outlets.

Scientifically designed equipment costing $350,000 has been installed to extract and bottle the juice. Brought into the plant over mechanical conveyors and sorting belts, the oranges go through a revolving brush washer which cleans all pores in the skin. After rinsing and drying, the fruit is cut in two with a circular silver knife, and the halves are pressed against spinning cones which extract the juice. A centrifugal strainer removes coarse pulp and seeds, and the juice of 30,000 oranges is blended in 500-gal. glass-lined tanks preparatory to bottling.

Sausage Improver

A NEW seasoning for sausages and prepared meats has been developed by Artaba Foods, Ltd., Long Island City, N. Y. Called Artaba Sausage Compound, the substance not only improves taste and flavor but prevents acidity and increases food value, the manufacturer maintains. It is prepared from vegetables and is so processed that these are not visible in the meat.

BUSINESS TRENDS

Cocoa Headed Up

MID-NOVEMBER saw cocoa beans cross 9 cents a pound on the New York market. This was the highest price since March, 1930. In spite of the mid-October recession from September highs, the lost ground was more than recovered, and some New York factors look for a rise to 10 cents before Dec. 31.

Question has been raised in Europe as to the justification for this state of affairs. It is pointed out that apparent disappearances of beans in the United States have been lower so far in 1936 than for the same months of 1935. However, opinion in this country is that the actual consumption, including that drawn by manufacturers from privately stored stocks, has been at least 10 per cent greater than last year.

When this opinion is combined with recent estimates of the African crop, down by at least 10 per cent from last month's estimate, and with the fact that Brazilian interests are failing to meet contract deliveries, the price rise seems justified. Some operators on the New York market are looking for a real shortage to develop.

Less Beet Sugar Used

FIGURES for sugar distribution in the United States during the first ten months of 1936 showed a decrease in the amount of beet sugar as compared to the 1935 period of about 11.8 per cent. This report, coming from Lamborn & Co. indicates that, during the same period, the cane sugar distribution rose 7,356 long tons, raw value, or about 0.2 per cent. Total sugar distribution for the ten months was 4,981,338 long tons, raw value, compared to 5,101,478 tons for the same ten months last year, a drop of about 2.3 per cent.

As the AAA reported a decrease of almost 500,000 short tons, refined, in stocks on hand between January and October, consumption of sugar may not have actually decreased. While demand for sugar by canners and preservers was considerably lower last summer, this was no doubt offset, at least in part, by the continued increase in sugar consumption by makers of confectionery, chocolate products, baked goods and ice cream.

Construction News

	Pending (thousands)	Awarded November (thousands)	Total Awarded 1936 (thousands)
Bakery	$187	$520	$2,187
Beverages	930	290	7,934
Canning and Preserving	40	137	358
Confectionery	....	....	67
Grain Mill Products	152	374	4,241
Ice Manufactured	905	37	571
Meats and Meat Products	2,288	40	2,607
Milk Products	137	144	1,464
Miscellaneous	634	306	5,971
	$5,273	$1,848	$25,400

Food Exports Higher

EXPORTS of canned foods from the United States for the first nine months of 1936 were in general higher than for the same period of 1935. Canned vegetable exports rose from 26,348,526 lb. to 29,347,771 lb. Canned fruits rose from 196,697,472 lb. to 219,984,952 lb. And canned fish exports increased to 69,438,812 lb. from the 66,486,983 lb. figure of 1935.

At the same time there has been a slight decline in canned meat exports, from 9,943,532 lb. to 9,116,082 lb. Canned milk products also showed decrease, with evaporated milk falling from 24,888,955 lb. to 19,440,054 lb., and condensed milk from 3,808,446 lb. to 1,959,871 lb.

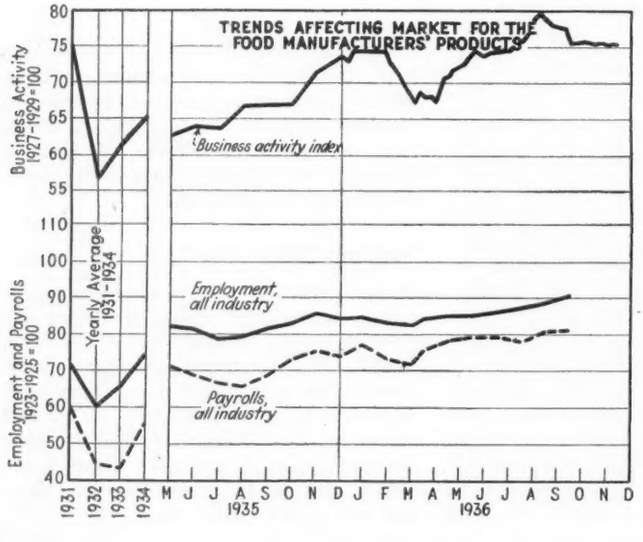
While these export figures were being recorded, imports of canned foods were registering some increases and some decreases. Canned meat imports increased from 57,533,869 lb. to 73,425,247 lb. and sardine imports rose from 20,440,112 lb. to 26,815,837 lb. In contrast, canned crab meet imports fell off from 8,225,949 lb. to 7,820,588 lb., and canned tomatoes from 44,584,074 lb. to 38,613,926 lb.

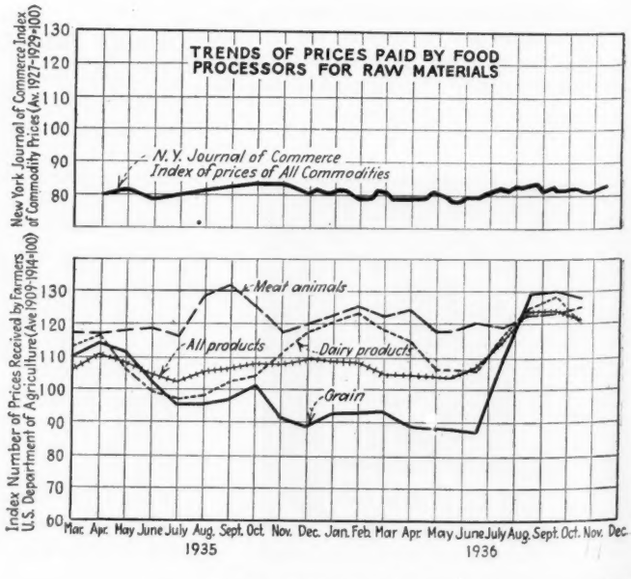
Taken as a whole, imports and exports of canned foods show no significant trends as to the total. Trends for individual items have been influenced temporarily by such factors as the Italian-Ethiopian war and the American drought.

Sausage Production Up

THE American Institute of Meat Packers reports that sausage production, during the first six months of 1936, was at an all time high. The production showed a 5 per cent increase over the previous record, made in 1929, and a 16 per cent increase over the five year average. Output totaled 394,000,000 lb., produced under federal inspection, 11 per cent over the 356,000,000-lb. put out in 1935.

This increase in sausage production undoubtedly bears a relation to the in-


TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business Activity 1927-1929=100
Business activity index
Yearly Average 1931-1934
Employment, all industry
Payrolls, all industry
Employment and Payrolls 1923-1925=100
1931 1932 1933 1934 1935 1936


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
New York Journal of Commerce Index (Av. 1927-1929=100) of Commodity Prices
N.Y. Journal of Commerce Index of prices of All Commodities
Index Number of Prices Received by Farmers U.S. Department of Agriculture (Ave. 1909-1914=100)
Meat animals
All products
Dairy products
Grain
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1935 1936

Business Activity Greater

ELECTION RESULTS, wage increases, dividend distributions and cooler weather are all having a bouyant effect upon general business. The curve of business activity charted by *Business Week* took a definite upward turn during the week ending Nov. 21 to reach 77.0 per cent of "normal"; 1.45 per cent higher than on Oct. 17 and 2.67 per cent above Oct. 31. Extra dividend checks and higher car loadings play important roles. Spread of seamen's strike will send carloadings still higher. In the face of labor difficulties automobile production is on the increase.

Commodity prices are on an upward move which is expected to become greater. Stock market activities reflect the stimulation of a speculative interest in trading; labor strikes and strife keep business leaders aware of economic realities.

According to labor statistics employment is greater. Machine tool orders are again on the upward grade as they are for automobiles and variety merchandise. Steel orders have slackened as anticipatory buying has beat the gun of rising prices.

United States Department of Labor schedule of wholesale prices for all commodities rose 1.48 per cent during five weeks ending Nov. 21; farm products went up 0.59 per cent while those for food went 2.42 per cent higher. New York *Journal of Commerce* general index of weighted prices advanced 1.96 per cent during same period. Grain prices made no net change; those for food jumped 2.22 per cent.

crease in hamburger consumption previously recorded in these pages. Throughout the year to date, demand has been better for the grades of cattle suitable for hamburger and sausage than it has for choice steers. It is thought that the consuming public is showing its resistance to the higher prices of the choicer meats in this way.

Candy Sales Up Again

SALES of confectionery and competitive chocolate products during September totaled $25,800,163. This is an increase of 7.7 per cent over the sales of $23,952,348 recorded in September, 1935.

According to the United States Department of Commerce, which made this report, sales in September this year jumped 73 per cent over August sales. This is the sharpest seasonal advance recorded in the confectionery industry since 1929.

Butter Barriers

CREAMERY INTERESTS are viewing the present situation in the butter market with some concern. In the face of recent large production, butter is not moving out into consumption in quantities to satisfy the industry.

In a recent report of the United States Department of Agriculture, the following statement was made: "Of some concern is the much slower out-of-storage movement of butter this year than last. Storage stocks of butter on Oct. 1 of 108,770,000 lb. were 40 million lb. less than a year earlier to be sure, but during the first four weeks of October this year's known reduction in 35 markets (which hold about 75 per cent of the total United States supply) was only 1,400,000 lb., whereas in these same markets last year there was a reduction during the same period of 17,000,000 lb."

On Nov. 1 butter in storage was 14,891,000 lb. below the previous year, but it was 2,358,000 lb. above the five year average.

Two barriers seem to be across the path to a satisfactory butter market. Price is one. It is true that rising levels of purchasing power might seem to indicate that present prices are not too high. But it is also evident that the consuming market continues to resist the rise from the low price levels of the depression.

The other barrier is that of habit. Short supplies and low consuming power have, over a period of years, confirmed many consumers in the habit of using butter substitutes.

It would seem that, to surmount these barriers, the creamery butter industry is faced with the necessity of inaugurating an intensive promotional campaign. Consumers must be won back to butter use, if the market is to show the desired improvement.

INDICATORS

BEEF CATTLE numbers are expected to increase during the next few years.

HOGS for slaughter during the current crop year, Oct. 1, 1936 to Sept. 30, 1937, are expected to be 10 to 15 per cent more numerous than during the past two crop years, but will still be some 20 per cent below the five year average.

PINEAPPLE JUICE pack in Hawaii this year is estimated at about 5,000,000 cases, twice the amount packed last year, and more than 4,000,000 cases above the 1933 total.

SNAP BEAN pack in 1936 is now estimated at 6,600,000 cases, compared to a pack of 7,100,000 cases in 1935.

GREEN LIMA BEAN crop for processing in 1936 is now estimated at 20,390 tons, 30 per cent above last year, and the largest crop on record.

LIMA BEAN pack for 1936 is estimated at 1,295,412 cases, canned fresh lima beans only.

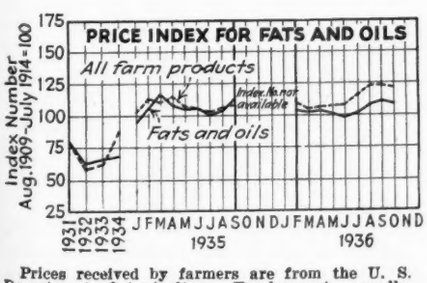
SWEET CORN canned in 1936 is estimated at 14,559,450 cases, compared with over 20,000,000 cases packed last year.

FIVE new canning plants have been erected in the lower Rio Grande valley of Texas this year, bringing the total plants in that district to 26, including two that did not operate last year.

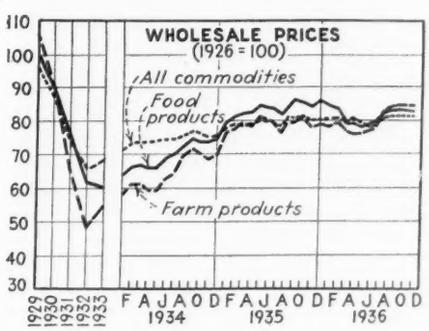
APPLE production for the United States in 1936 is now estimated at 104,942,000 bu., compared to a production of 161,333,000 bu. in 1935.

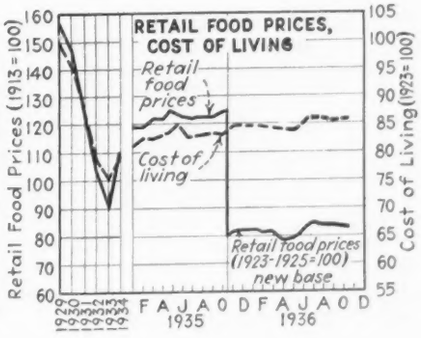
RICE production in the United States is expected to be around 45,500,000 bu., which will be the largest output of this grain in the last sixteen years.

CARLOADINGS in November slacked off from the highs recorded in September and October, but at the middle of the month were still 16 per cent above the figure for the corresponding period of 1935, and 27.7 per cent above the 1934 loadings.


PRICE INDEX FOR FATS AND OILS
Index Number Aug. 1909-July 1914=100
All farm products
Index Number not available
Fats and oils
1931
1932
1933
1934
J F M A M J J A S O N D J F M A M J J A S O N D
1935
1936

Prices received by farmers are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Data concerning corn, hogs and the corn-hog ratio is from the U. S. Department of Agriculture.





Keeping Up WITH THE FIELD

Legislation—Taxes—Federal Action—Government Inspection—Trade Troubles—Packaging—People

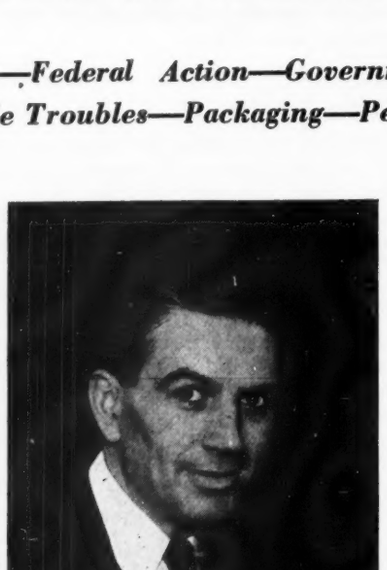
Patman Law Challenged. Points which will test the mettle of the Patman Act have been brought up in the answer by Kraft-Phenix Cheese Corp. to the Federal Trade Commission's charges that it violated that law. Answering the Commission's complaint in detail, the cheese company denies that any of its acts are or have been contrary to the act. And as its first "special defense," this corporation challenges the constitutionality of the measure.

Kraft claims that its price differentials and price discounts apply solely in sales to retailers, and that these retailers resell the product in intrastate commerce only. And on that basis, it alleges that price differentials and discounts could, at most, affect only competition of individual retailers engaged solely in intrastate commerce. Then it claims that Congress has no authority to enact laws to protect competition in intrastate commerce. And if section 2 (a) of the law makes price discriminations having that effect illegal, then it is unconstitutional because it exceeds the power of Congress to regulate commerce, the company asserts.

Shefford Cheese Co., a second food manufacturer to be charged with violation of the Patman Law, denies the charges and asks that the complaint be dismissed. While admitting the use of price differentials, the company states that these made only due allowances for differences in the cost of manufacture, sale or delivery.

More Patman Violations. Two more large food companies have fallen victim to Federal Trade Commission charges of violation of the Patman Act. Standard Brands, Inc., and Anheuser-Busch, Inc., both are alleged to have discriminated between purchasers in the sale of baker's yeast. They sold yeast at 14 cents a pound to buyers of 50,000 lb. but charged 25 cents a pound to buyers of 150 lb. or less, the FTC says.

The Commission also charged Standard Brands with selling foil-wrapped yeast at 27 cents a dozen cakes when the customer took 300 cakes or more monthly, while asking 30 cents a dozen for the smaller amounts.



DR. REXFORD G. TUGWELL

Tugwell Joins Industry. The resignation of Dr. Rexford G. Tugwell as Undersecretary of Agriculture to become executive vice-president of American Molasses Co. has a double significance for the food industries. First of all, it probably means a more reasonable and workable food and drug bill, with chances for rather prompt enaction in the next session of Congress. The more radical ideas of the Undersecretary have been blamed for past delays in getting a new bill accepted.

The second significance attached to Dr. Tugwell's change of positions is found in Washington's confident expectation that the sugar tariff will come up for renewed consideration. Tugwell will be associated with two of the other original "brain trusters," Charles W. Taussig, president of American Molasses Co., and A. A. Berle, Jr., a director of the company. So the sugar importers certainly will not lack for spokesmen well acquainted in official quarters when they appear before Congress and the tariff adjusters. Representatives of the domestic sugar industry are frankly worried. It remains to be seen whether the group of Western Senators who commonly gather in a silver bloc, may be equally well organized as a sugar bloc.

Food Bill to Follow S-5. If there is any fear that the new food and drug bill to be introduced by Senator Copeland will contain radical provisions, it is unfounded. The new measure is expected to follow the lines of S-5, which passed the Senate in the last session of Congress but went down in defeat before a House torn by arguments as to whether the advertising provision should be administered by the Food and Drug Administration or by the Federal Trade Commission.

The framers of this new legislation fully realize that an entirely new measure would have to start from scratch and take all the hurdles that S-5 took before it stumbled a few yards short of the tape. That would unduly delay the bill, perhaps to the point of causing it to fail.

As to whether the advertising provisions of the measure will be placed under the F&DA or the FTC there has been no hint. The FTC has its hands full with the Patman Law, however. Besides, some are opposed to further extension of the Commission's powers and responsibilities.

Food manufacturers, in general, favor a law along the lines of S-5. But some of them would like a clearer definition of proprietary food.

Another food-law possibility is that Congress may amend the existing law rather than pass an entirely new bill.

Sweet Problem. Always beset with its troubles, the sugar industry apparently has been functioning fairly smoothly since quotas were established. But recently these same quotas have been blamed for a bad situation. They have resulted in an excessive supply of sugar, which not only has depressed prices but has created a refiners' market. That is the protest of American Sugar Cane League, which feels that the quotas have been increased too much.

Moreover, the method of establishing quotas is all wrong, say the domestic producers. They would have all restrictions on production in the continental United States lifted, with quotas of offshore sugars based upon the portion of domestic requirements

which domestic producers could not fill. Determined efforts will be made at the next session of Congress to put this into effect.

Domestic producers also want a price increase of one-half cent a pound, this to be passed on to consumers. Such a rise would bring about a rapid expansion of cane and beet acreage, it is felt.

Sugar Group Dissolves. All activities are to be suspended, at least for the present, by Sugar Institute, Inc. While no reason was officially announced, it is likely that the organization of cane sugar refiners had too big a crimp put into its activities by the decision of the Supreme Court last March. This decision held 45 of the Institute's practices to be in violation of the Sherman Act. The Institute has done little more than compile statistics since it wings were clipped. Before, it had been an important factor in the sugar industry.

Packers Raise Wages. Rates of pay in the meat packing industry have hit a new high, being now about 20 per cent above the 1929 pre-depression level and half-again as much as the low of 1932. This was brought about by a wage increase of 7 per cent, effective Nov. 2, by the Big Four in Chicago—Armour & Co., Swift & Co., Wilson & Co. and Cudahy Packing Co. —and also by Geo. A. Hormel & Co., Austin, Minn.

Labor leaders will no doubt be surprised to learn that this 7 per cent increase was obtained through negotiations by company employee organizations. And manufacturers in other fields will be pleased to know that these same organizations agreed to accept two cuts of ten per cent during the depression.

The increase just announced is the third pay boost, and it brings the common labor wage to 53.5 cents and the top skilled rate to $1.08 an hour.

Malt-Beverage Regulations. New regulations controlling the labeling and advertising of malt beverages sold in interstate commerce have been issued by the Federal Alcohol Administration, effective Dec. 15. These set up for the first time a standard of identity for ales, porters and stouts. Beverages with an alcohol content of more than 5 per cent become ale. Porters and stouts are beverages of a heavier brew, but with virtually the same alcohol percentage. Beverages containing less than 0.5 per cent of alcohol by volume are classified as cereal beverages.

Grade Labeling. Resumption of the fight over grade-labeling when Congress convenes is anticipated. Government and consumer agencies, such as the Consumer Division of the Department of Labor and the Bureau of Home Economics of the Department of Agriculture, as well as private organizations, are expected to seek further extension of the present grading laws and regulations.

The attitude of the consumer agencies is simply put. If, they contend, canners find it to their advantage to use government grades up to the point of retail sales, why should not the benefits of the system be extended to the consumer? The official attitude at Washington is that any such move is a matter for industry itself to take.

Advocates of grade labeling still point with pride at the Great Atlantic & Pacific Tea Co., which voluntarily adopted A, B, C grades for several canned products. From Jan. 1 to Nov. 1, this year, A. & P. used 146,948,000 labels. Of these, 40,434,000 were grade A, 939,000 grade B and 105,555,000 grade C.

HEADS MILK DEALERS

R. C. Fisher of Waterbury, Conn., was elected president of International Association of Milk Dealers at the annual convention in Atlantic City

ICE CREAM LEADER

Madison H. Lewis, of Borden Co.'s Pioneer Ice Cream Division, New York, is president of International Association of Ice Cream Manufacturers for the coming year.

Bottlers Buy. Business has been good during the past year for bottlers of carbonated beverages. And the bottlers were in a spending mood at the annual ABCB exposition and convention in Chicago late in October. One exhibitor is said to have sold nearly 500 pieces of equipment, many of which were large machines. Total sales for all of the 137 exhibitors has been placed at between three and one-half and four million dollars by unofficial estimate.

The convention was a big success, too. Attendance of more than 5,000 set an all-time record. As is customary at the bottler's meetings, several papers on practical plant problems were presented. In the way of non-technical advice, the bottlers were told by Dr. Morris Fishbein, editor of *Journal of the American Medical Association,* to refrain from adding vitamins to their beverages. Consumers buy beverages to quench their thirst, not for medicinal purposes, he said.

At the close of the convention, American Bottlers of Carbonated Beverages elected Charles P. Nevin, Butte, Mont., president. Illness had prevented Mr. Nevin from attending the convention, and he passed away a few days after being chosen as the industry's leader. It is likely that he will be succeeded by George S. Derry, vice-president.

New Definitions. Six different forms and conditions of the egg have been defined by the Department of Agriculture. The recommendations of the Food Standards Committee, these definitions are a guide to the trade as well as to officials. They follow:

1. Liquid Eggs, Mixed Eggs. The product obtained by separating the edi-

Buy Some

IT is always a pleasure to put in a good word for a worthy cause. So FOOD INDUSTRIES would like to remind its readers that the annual Christmas seal sale began on Thanksgiving and will continue until Christmas. As you know, money spent for these seals will go to fight tuberculosis.

Medical supervision in large plants is helping to solve this health problem. Yet the mortality from tuberculosis is six and one-half times higher in the lowest than in the highest economic group, according to National Tuberculosis Association.

ble portion of eggs from the shells. It is an intimate mixture of the whites and yolks in their natural proportions.

2. Frozen Eggs. The solidified product obtained by quickly and completely freezing liquid eggs.

3. Dried Eggs. The product obtained by evaporating the water from liquid eggs. It contains not more than 7 per cent of moisture.

4. Egg Yolk. The product obtained by removing the whites from the yolks in the commercial process of egg-breaking. It contains not more than 12 per cent by weight of adhering white.

5. Frozen Egg Yolk. The solidified product obtained by quickly and completely freezing egg yolk.

6. Dried Egg Yolk. The product obtained by evaporating the water from egg yolk. It contains no more than 5 per cent of moisture.

Inspected Shrimp. Shrimp packers have found government inspection to be exceedingly worth while, even if they do have to pay for it. The popular respect for shrimp in cans has literally skyrocketed since the Food and Drug Act was amended to permit inspection in sea-food plants. So great has been the increase in the demand that the packers would like to be able to extend the canning season. Their supplies were virtually sold out at the close of the fiscal year. It is pointed out in the annual report of the Food & Drug Administration that the inspected shrimp packed in 1936 amounted to 967,380 cases, as compared to 300,054 cases the year before. The uninspected portion of the 1936 pack amounted to less than one hundred thousand cases. And next season, government inspectors are expected to be in practically all of the plants.

Packaging Exposition. The premier event of the packaging year will be held in New York, March 23-26, at the customary place, the Pennsylvania Hotel. This event is the Packaging Exposition sponsored by American Management Association concurrently with conferences and clinics on packaging, packing and shipping. A feature attraction will be the exhibition of entries for the Irwin D. Wolf Trophy and awards for distinctive merit in packaging.

Chain Tax Invalid. It is not within the law for a State to tax gross receipts of a chain store. That has been established by the decision of the United States Supreme Court, which holds invalid by a 6-2 majority one section of the Iowa chain store law. That section levied a tax ranging from $25 on the first $50,000 of gross receipts up to $1,000 for each $10,000 of gross receipts in excess of $9,000,000. Whether chain stores may be taxed on a basis of number of establishments was not covered in this decision.

Rules Against High Tax. Kentucky ice cream manufacturers are feeling better. The 28-cent a gallon tax which has been shoving them in

They have to "sell on sight"

Products such as those shown here cannot expect active selling from the retailer. Once placed on display, they must sell themselves. This requires wrapping that will catch the eye, arouse desire, lure the nickel or dime from purse or pocket . . . And, equally important, the wrapping must keep the product in first-class condition, so that it will be enjoyed at its very best. In short, do a real selling job from start to finish.

This is the kind of sales-winning packages our machines produce, and the reason why they wrap so large a percentage of America's packaged goods—food stuffs, confectionery, tobacco, cigarettes, pharmaceuticals, etc.

Your product may be quite different—but you *do* want the utmost selling-value and the best protection you can get. *Also the lowest cost.*

With a large line of machines that handle practically every type of packaging material, we are in a position to provide the right machine for your needs.

MODERNIZE

Right now, when so many concerns are modernizing for package improvement and lower costs, is the time to consider your package. We will be glad to give you the benefit of our wide experience. Get in touch with our nearest office.

PACKAGE MACHINERY COMPANY
Springfield, Mass.

NEW YORK CHICAGO CLEVELAND LOS ANGELES
MEXICO, D. F., Apartado 2303 Peterborough, England: Baker Perkins, Ltd. Melbourne, Australia: Baker Perkins, Pty. Ltd.

PACKAGE MACHINERY COMPANY
Over 200 Million Packages per day are wrapped on our Machines

CONVENTIONS

DECEMBER

Nov. 30-Dec. 5—Twelfth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.
2-3—Tri-State Packers' Association, Benjamin Franklin Hotel, Philadelphia, Pa.
2-4—American Society of Refrigerating Engineers, Hotel Pennsylvania, New York.
7-10—Association of Dairy, Food & Drug Officials, Miami Biltmore Hotel, Coral Gables, Fla.

JANUARY

12—Southeastern Millers' Association, Brown Hotel, Louisville, Ky.
14-16—American Fruit and Vegetable Shippers' Association, Stevens Hotel, Chicago.
24-30—National Canners' Association, Stevens Hotel, Chicago.
24-28—Canning Machinery & Supplies Association, exposition, Stevens Hotel, Chicago.
23—National Food Brokers' Association, Stevens Hotel, Chicago.
25-26—Potomac States Bakers' Association, Lord Baltimore Hotel, Baltimore.
27—National Pickle Packers' Association, Palmer House, Chicago.

the direction of bankruptcy recently was declared unconstitutional in the Franklin Circuit Court. Judge W. B. Ardery ruled that the tax was "discriminatory, if not substantially confiscatory," and he restrained the State from collecting the levy. The case, instituted by Aniello Nocero, ice cream dealer and manufacturer of Covington, has yet to be passed upon by the Court of Appeals before the State accepts its defeat as final.

Japanese Scare. Fisherman on the Pacific coast are worried lest the Japanese ruin their industry. Association of Pacific Fisheries, meeting in Seattle recently, passed a resolution expressing the opinion that "the announced plan of the Japanese to exploit the salmon fisheries of Alaska on the high seas is a serious menace . . ." And the organization has called the matter to the attention of officials in Washington.

It seems that experimental fishing was conducted by the men from Nippon in the coastal waters this year. Scientific data, from which the location of profitable fishing areas could be determined, were collected.

Experts in the fishing industry point out that floating canneries could be operated outside the territorial waters of the United States and Canada. These could catch and can both salmon and halibut.

CONCENTRATES

• In calling a meeting this month of the Council for Industrial Progress, Major George L. Berry will make another bid for labor and industry to get together in drafting legislation.

• *"All reputable canners are behind the Patman Act because they know it probably will eliminate cut-throat competition and may result in a more stable price level for producer and consumer alike," says Paul Fischback, secretary of National Food Brokers' Association.*

• Experiments with the growing of soft wheat in Texas have progressed to the point where the Department of Agriculture has agreed to finance the project on a larger scale.

• *Among more than 750 large corporations which contemplate abandoning their pension plans with the advent of federal collections for social security are Armour & Co., Swift & Co., Cudahy Packing Co. and Libby McNeill & Libby.*

• National Food and Grocery Conference Committee will develop a model bill to prevent below-cost selling at retail. The bill will be offered for enactment by each State.

• *Decreasing per capita consumption of bread is explained by government food specialists as the result of a lower per capita need for calories.*

• Armour & Co. is marketing the dairy and poultry products of Land O'Lakes Creameries in territories not covered directly by the cooperative.

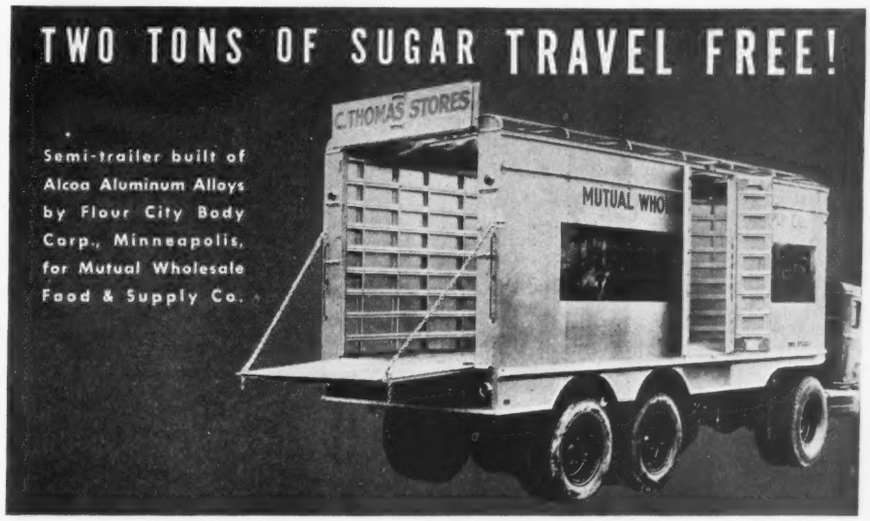
• *Vacations with pay for laborers are to be granted by General Mills, Inc. Employees with the company three years get one week. Those in service ten years, two weeks.*

• It is suspected in some quarters, but not proved, that tin plating on cans is unnecessary for food protection. The plating, it is suggested, is almost purely a habit. Corn and tomatoes are said to be the only foods not successfully packed in lacquered steel cans.

• *The Supreme Court has declined to review three cases involving the legality of the 3-cent-a-pound tax on coconut oil from the Philippines.*

• A four-day intensive course in ice cream manufacture will be given by University of Illinois, Urbana, Feb. 23-26.

TWO TONS OF SUGAR TRAVEL FREE!



Semi-trailer built of Alcoa Aluminum Alloys by Flour City Body Corp., Minneapolis, for Mutual Wholesale Food & Supply Co.

. . . AS BONUS LOAD

"Our experience to date indicates that properly constructed Aluminum bodies are a good investment. We will be interested in a 22-foot Aluminum Monocoque or Chassisless semi-trailer for our next fleet addition . . ." — From a letter recently written by Mr. Robert Kelley, Transportation Superintendent of Mutual Wholesale Food and Supply Company, to Aluminum Company of America.

No wonder Mutual Wholesale will want another Aluminum body for their next fleet addition!

This truck, now used by the operator, carries *2 tons* of sugar *free* on every trip. Here's the reason:

40 sacks of sugar ride as Bonus Load. They replace unnecessary dead weight eliminated from the body by building of Alcoa Aluminum instead of heavy materials.

That is how bodies made from Alcoa Aluminum Alloys save. The Bonus Load quickly pays for the Aluminum construction, then becomes pure profit.

And for hauling food, Aluminum gives safety as well as saving. Alcoa Aluminum is Friendly to Food, it cannot contaminate, or alter color, taste, and odor. Being resistant to corrosion, it is easily kept clean and clean looking.

Are these advantages worth investigating? Ask your body builder, or send for our complete handbook, "Alcoa Aluminum for Truck Bodies." Address ALUMINUM COMPANY OF AMERICA, 2152 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA · ALUMINUM

MEN, JOBS *and* COMPANIES

Industry

• ANHEUSER-BUSCH, INC., St. Louis, has let a contract for the construction of a $750,000 fermenting plant.

• ATLAS BREWING CO. is modernizing its Chicago plant at a cost of $100,000.

• BLATZ BREWING CO., Milwaukee, will spend $800,000 in an expansion program which will include a seven-story stockhouse.

• BROOKLAWN CREAMERY CO., Salt Lake City, is expending $100,000 on its Utah plants, including a new butter and powdered milk plant at Beaver and a cheese plant at Mount Pleasant.

• ENOCH MORGAN'S SONS CO., New York, has acquired the business, goodwill and assets of Cox Gelatine Co.

• GOLD DUST CORP. recently changed its name to Hecker Products Corp. A plan for liquidation of domestic operating subsidiary companies has been approved.

• HAMPTON CRACKER CO., Louisville, subsidiary of Consolidated Biscuit Co., is spending $50,000 on a plant addition to increase capacity 25 per cent.

• HELMS BAKERIES, Los Angeles, is adding a $200,000 extension to its plant, placing it among the largest of southern California bread makers.

• KRAFT-PHENIX CHEESE CORP. is building a new plant at Detroit, to be used for warehousing and curing cheese and as a point of distribution for all Kraft products. Kraft-Phenix will increase production of malted milk at Wausau, Wis.

• KROGER GROCERY & BAKING CO. will open a large plant at St. Louis soon. It is spending $300,000 to improve a building and install equipment.

• LAND O'LAKES CREAMERIES, Minneapolis, plans to put up a $125,000 milk drying and processing plant.

• MANITOBA SUGAR BEET REFINING CO. will erect at Winnipeg, Canada, a beet sugar plant with a daily capacity of 1,000 to 1,200 tons, at a cost of $1,250,000.

• MILLER BREWING CO., Milwaukee, has embarked on a $250,000 building expansion program which will increase plant capacity by 50 per cent.

• OMAR BAKING CO. plans to open a distributing branch at Zanesville, Ohio.

RAY G. HAMANN

Hecker H-O Co., New York, has made him general manager. He had been general sales manager of the concern.

• ORANGE COUNTY CANNERS has established a $2,000,000 plant at Fullerton, Calif., to can orange juice. The plant has a capacity of 3,000,000 cases.

• DR. PEPPER BOTTLING CO. is putting up a bottling plant at Whitesburg, Ky.

• PRODUCERS' COOPERATIVE ASSOCIATION recently took over the former Libby, McNeill & Libby milk plant at Juneau, Wis.

• J. SCHOENITH CO. has begun construction of a chewing gum factory at Charlotte, N. C. Ralph Hart, formerly with Dixie Chewing Gum Co., will be production manager.

• SOUTH TEXAS COTTON OIL CO. has under way a $150,000 cottonseed oil mill at Harlingen, Tex.

• STOKELY BROS. & CO., Indianapolis, has purchased the modern plant of Good Foods, Inc., Tampa, Fla. Stokely's grapefruit and grapefruit juice canning operations will be centered at Tampa.

• SWIFT & CO. recently took over Arnold Bros., Inc., one of the oldest meat packing concerns in Chicago.

• WESSON OIL & SNOWDRIFT CO. has purchased the property and assets of International Vegetable Oil Co., Inc., Memphis. The price was $650,000 cash. This makes Wesson one of the largest cotton oil operators in the country.

• WILSON & CO., INC., has opened a modern branch plant at Pittsburgh. The plant has facilities for making sausage, cooking and smoking meats and for boning and cutting.

Personnel

• RALPH M. BOHN, director of the technical institute of Independent Biscuit Manufacturers, has gone to the West Coast to operate his own plant.

• S. B. BRADSHAW has been appointed manager, and Dr. E. F. Pike, technical director, of Armour & Co.'s laboratories at Chicago. Mr. Bradshaw, a chemist, has been with Armour in London for several years. Dr. Pike is a former member of the faculty at Towne Scientific School.

• R. G. BRYAN has resigned as production manager of Jones Bros. Bakery, Greensboro, N. C., to go with Sunlight Bakery, Roanoke, Va., in a similar capacity.

• ROBERT A. BURNS is the new director of sales and advertising for Whiting Milk Co., Boston. Mr. Burns had been in charge of wholesale sales for Borden's Farm Products Co., New York.

• GEORGE A. DAYTON, Towanda, Pa., again heads up Buckwheat Millers' Association.

• JOHN EVANS, Ashland, Ky., has been elected president of Kentucky Master Bakers' Association.

• FRANK J. FOSS has returned from the Argentine, where he was general manager for Wilson & Co., and will be connected with Wilson's cattle-buying department.

• HAROLD HALL becomes vice-president of J. R. Short Milling Co., Chicago. He had been sales manager for five years.

• H. T. Hood, 2nd., succeeds the late Gilbert H. Hood as president of H. P. Hood & Sons, Boston.

• E. F. HORN is the new president of Southeastern Cheese Association.

• D. J. KIRK, George Urban Milling Co., Buffalo, has been chosen chairman by the Niagara Frontier section of American Association of Cereal Chemists.

• L. E. KOPITZKE, Marion, Wis., has been made president of Northwestern Wisconsin Cheese & Butter Makers' Association.

• NORMAN F. KRUSE is the new director of the recently established research department of Central Soya Co., Chicago. Mr. Kruse had been with Procter & Gamble Co.

• WILLIAM LAMAR has replaced Mario Gianini as production manager of Novia Candy Co., Brooklyn, N. Y. Mr. LAMAR previously had charge of factory operations at Rigney Candy Co., Brooklyn.

• MELVIN MASON heads up Pure Milk Products Cooperative, a Wisconsin organization.

• HAROLD MORGAN has left the margarine and mayonnaise division of Wilson & Co. to go with Standard Nut Margarine Co., Indianapolis.

• DR. HUGH PARKER, research department, Wallace & Tiernan Co., Inc., Newark, N. J., is the new chairman of the New York section of American Association of Cereal Chemists.

• HARRY C. PETERSON, formerly in the Chicago office of Fleischmann Malting Co., becomes plant superintendent of the company's unit in Waukesha, Wis.

• DR. LLOYD K. RIGGS is now director of research for Kraft-Phenix Cheese Corp., Chicago.

• A. A. ROBINSON, formerly of the research department of Wilson & Co., is now with Standard Nut Margarine Co., Indianapolis.

• PERIE RUMOLD, Southwestern Milling Co., heads up the Kansas City section of American Association of Cereal Chemists.

• D. D. SMITH recently resigned as manager of Sessions Ice Cream Co., Fond du Lac, Wis., and has purchased Hartig Ice Cream Co., Watertown, Wis.

• HAROLD G. STEVENS has been elected president of New England Bakers' Association.

• EUGENE TIBBETTS, formerly assistant superintendent of the Nestle condensery at Reedsburg, Wis., has been named superintendent of the company's plant at Tuscaloosa, Ala.

• GERALD B. THORNE, former divisional director of AAA, has joined the staff of Wilson & Co., Chicago.

• H. G. WALTER, who has been in charge of the specialty products department of Igleheart Bros., Inc., Evansville, Ind., has been transferred to the New York headquarters of General Foods Corp.

Deaths

• WILLIAM C. DALEY, 50, superintendent of Plankinton Packing Co., Milwaukee, Oct. 17. He had been in the packing industry 35 years.

• FRANK E. DAVIS, 51, founder of what is believed to be the first mail-order fish company, at Gloucester, Mass., Nov. 15.

• PETER DOELGER, 75, for many years president of the old Peter Doelger Brewery, New York, Nov. 15.

• FRANK J. FORSTER, 64, vice-president and sales manager of Columbia Brewing Co. and former president of Forster Baking Co., at St. Louis, Oct. 26.

• ARTHUR G. GAINER, 52, head of Gainer's Ltd., Edmonton, Canada, recently. He was one of the best known packing-plant authorities in Western Canada.

• HOWARD S. HOLMES, 50, president of Chelsea (Mich.) Milling Co., Oct. 29. He fell down an elevator shaft at the mill.

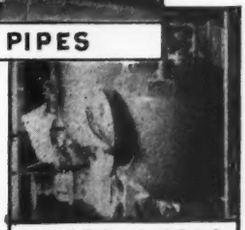
• WILLIAM J. HOTCHKISS, pioneer California fruit grower and packer, at Oakland, Calif., Nov. 2. He was a director of California Packing Corp. and chairman of its executive committee.

• F. G. JENSEN, 84, president of the Springfield, Mass., ice cream and candy company bearing his name, Oct. 31. He

USE OAKITE MATERIALS FOR DEPENDABLE LOW-COST *Sanitation*

COOKERS

PIPES



EVAPORATORS

The reason so many concerns use Oakite cleaning and sterilizing materials and methods is because they are DEPENDABLE . . . help consistently maintain a uniformly high standard of sanitation at low cost.

Without obligation on your part, let our Service Man in your locality place before you more data that will enable you to secure the same advantages and economies others in your line of business are now enjoying through the use of these same efficient, DEPENDABLE materials. Tell us your problem . . . we can help; or, write for interesting free booklets.

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OAKITE

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SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

pioneered the manufacturing of candy and ice cream in New England.

• NATHAN KAHN, 66, first vice-president of E. Kahn's Sons Co., Cincinnati, Nov. 11.

• ALBERT S. KLEIN, JR., 41, vice-president and sales manager of Walter Birk Candy Co., Chicago, Oct. 31.

• WILLIAM M. LINEBERGER, 46, president of Shelby (N.C.) Creamery Co., Oct. 25.

• CHARLES H. LYMAN, 73, founder of Guyan Creamery and one of the organizers of Huntington Creamery Co., at Huntington, W. Va., recently.

• JOHN T. MCELROY, 87, pioneer meat packer of El Paso, Texas, Oct. 14.

• JOSEPH F. PHELAN, 44, laboratory director of H. P. Hood & Sons, Inc., Boston, Nov. 4.

• CARL J. ROWDEN, 71, founder of Hemlock Creamery Co., at Chattanooga, Oct. 17.

• OTTO H. SENGLAUB, 62, secretary and assistant treasurer of Kingsburg Breweries Co., at Manitowoc, Wis., recently.

• JOHN J. SOMMER, 87, proprietor and operator of Sommer Flour Mill, Canton, Ohio, recently.

• W. A. VAN CAMP, 74, son of the founder of Van Camp's Inc., Indianapolis, and connected with that company until he retired.

• T. B. WAGNER, 67, chemical engineer who developed several of the chemical processes involved in the manufacture of corn syrup, Nov. 12. He was general superintendent of Corn Products Refining Co., New York, from 1900 to 1906 and was on its executive board from 1906 to 1919. Later he was vice-president of United States Food Products Corp. and of Liberty Yeast Corp. Mr. Wagner was on the original editorial advisory board of FOOD INDUSTRIES.

• EDWARD P. WELLS, 88, chairman of the board and one-time president of Russell-Miller Milling Co., Minneapolis.

Associated Industries

• AMERICAN CAN CO., New York, has elected G. H. Kellogg vice-president in charge of the sale of packers' cans. A. H. Nugent becomes general manager of sales, packers cans, while R. M. Roberts has been made assistant general manager of sales, packers cans.

• AMERICAN ROLLING MILL CO. will build a modern research laboratory at Middletown, Ohio.

• CHAIN BELT CO., Milwaukee, has appointed B. E. Sivyer, Jr., branch manager at San Francisco.

• FOOD MACHINERY CORP. has purchased the Parker Machine Works, Riverside, Calif., and Paxton Nailing Machine Co., Santa Ana, Calif.

• B. F. GOODRICH CO. Akron, Ohio, has appointed J. E. Power manager of the New York district; E. P. Weckesser, manager of the Newark district; and R. J. Devereaux, manager of the Buffalo district.

• NATIONAL CAN CO. has appointed Jack M. Cross manager of its planning and development department. He formerly was with Continental Can Co. in a similar capacity.

• PFAUDLER CO. has appointed William E. Gray, Jr., special European representative, with headquarters in London.

• EDWARD W. ROBOTHAM & CO. has been organized at Hartford, Conn., to act as advertising and sales counsel to New England manufacturers.

• WESTINGHOUSE ELECTRIC INTERNATIONAL CO. announces appointment of John W. White as general manager.

THE MOST
Flexible
FILLER YOU
HAVE EVER
SEEN . . . . .
So versatile it will fill practically any kind of container with almost any kind of material, the Stokes & Smith Universal Filler, with Gross Weight Scale, comprises four different machines in one single unit. These are:
1. A gross weight scale with auger feed.
2. A volumetric filler measuring material by the volume of the package.
3. A volumetric filler measuring material by the turns of the auger, a very precise way for the smaller quantities.
4. A packing machine to compress the material into packages.
Changing from one type of container to another, even from any paste to free-flowing powder, is only a few minutes work.
May we arrange a demonstration for you?
STOKES & SMITH CO
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4911 Summerdale Avenue, Philadelphia, U. S. A.

Dryer Would Not Work

(*Continued from page* 611)

four paddle arms on the shaft. Further, if the labor of the paddles was merely the moving of the mass of fish, the four swings should all be approximately the same, but if the scraping of the walls was an additional factor, the swings would be unequal if the clearances of the four paddle arms from the wall were unequal.

Observation of the ammeter needle quickly confirmed this. Not only did the ammeter needle make four perfectly regular swings per revolution of the shaft, but the swings were not all of the same magnitude. They went through a regular cycle of swings — medium — strong — slight very strong—medium strong—slight —very strong. This appeared to indicate that the paddle arms were not all accurrately of the same length and clearance, but differed from one another in these respects, according to the following scheme:

Ammeter needle swing	Length of paddle arm	Clearance of paddle arms on bottom half of cylinder
medium	medium	medium
strong	long	narrow
slight	short	wide
very strong	very long	very narrow

The second and fourth paddle arms had to scrape off thicker layers of dried cake than the first and third.

Also, if the hypothesis were correct, it should be possible by careful test to observe a slight rise and fall of the shaft in the bearing and stuffing box as each paddle arm passes over the bottom half of the cylinder. A gaging arrangement was set up on the end of the shaft in such a way as to magnify the up-and-down motion on a needle. The gage needle, as expected, clearly confirmed the findings on the ammeter; in fact, the gage needle swung four times each revolution of the shaft, in time with the ammeter, and exactly with the same relative amplitude. There was then no doubt, even before the dryer was opened and emptied, what would be found inside, and just what was the trouble. In the emptied and cooled dryer, examination of the paddle arms showed varying lengths and clearances of the arms, one being of medium clearance, one narrow, one wide, one very narrow, all in exact accordance with the swings of the ammeter needle and shaft gage. The motor would always stall when one of the long arms passed over the bottom of the cylinder.

The rising and falling of the shaft in the stuffing box also explained the leakiness of the latter even with frequent repacking.

It was also found that the "edges" of the paddles were not edges at all but merely slabs of ½-in. boiler plate sheared off square; the "edges" of these square faces had worn smooth and rounded so that the paddles tended to ride up on the cake rather than scrape it off, putting an unbearable stress on the whole equipment. The locations of the four paddle arms were now marked on the ends of the shaft by means of a center-punch, and the dryer then charged and put into operation. The behavior of the ammeter and shaft gage exactly corresponded to the positions of the arms indicated by the center-punch marks.

The hypothesis was thus completely confirmed and the causes of the trouble fully diagnosed and understood. The indicated remedy was to put, in place of the slabs used for paddles, real cutting members of hard steel and with sharp edges, set at a sharp

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Because . . . Yale Chain Hoists have an international reputation for QUALITY and that quality is based on the outstanding features of construction, as follows:

1 Heavy forged steel safety hook and cross head designed to withstand shock.

2 Heavy wrought steel suspension plates support the load between the top hook cross head and load sheave.

3 The load sheave on which the load is lifted is a massive special analysis steel casting.

4 The driving pinion is a one-piece forging of special steel.

5 Ball bearings upon which the load sheave is mounted are of high carbon chrome alloy steel running in chrome vanadium steel races.

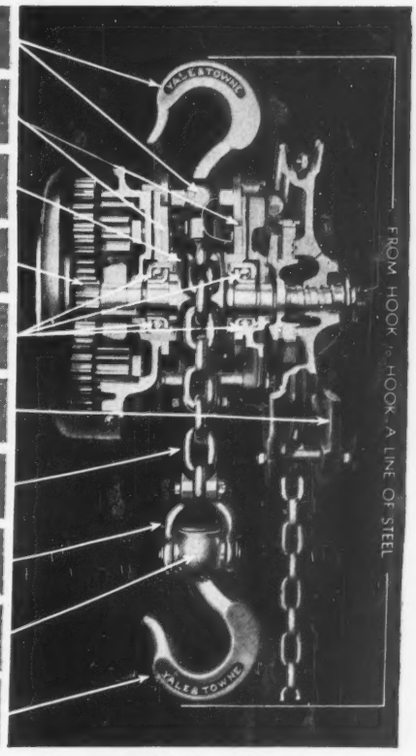
6 A continuous and adjustable hand chain guide prevents snagging—with a tensile strength of 50,000 lbs.

7 The load chain is of steel, welded and heat treated.

8 Drop forged two-piece shackles with heat-treated suspension pin permit changing or replacing load chain without welding.

9 Lower hook is equipped with heavy duty ball bearing, completely enclosed, packed in grease, requires no further lubrication.

10 Steel safety hook opens slowly without fracture before any other part of the hoist is overstrained—protects operator and load.



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PHILADELPHIA DIVISION

angle with the surface of the cylinder wall so as to shave off the cake instead of pushing or rubbing it off, or riding over it. It was also necessary to set these blades all accurately to the same clearance so that no one blade would do more work than the others.

When the new sharp blades were in place, the stuffing boxes were packed and the dryer charged with a full load, the drying occurred smoothly and with lighter load on the motor, and no more trouble from that source was encountered.

Yet when all was running smoothly, and the full cycle of pressures, ammeter readings and moisture content of waste was studied, some further useful observations were made. As before, the load was very light for the first two hours, during which the moisture content of the waste was reduced from about 75 per cent to 40 or 50 per cent. Then the dough or putty stage was approached, with steady increase of the load as shown by the ammeter. Operation continued under the heavy load for a time and then, within a period of two or three minutes, dropped to its original amperage. This almost sudden drop in power required was found to correspond to the reaching of a crumbly stage in the material in the dryer. As soon as the material lost its cohesiveness and became crumbly, it fell apart and little power was required to move it, and no cake formed on the wall from that time on to the end of the batch.* The cake that had already formed on the walls equal in thickness to the clearance of the cutters, fell off in large slabs and broke up with the meal, leaving smooth polished cylinder walls. This critical change always occurred almost suddenly at a definite water content.

This last observation gave rise to still further improvement in the process. Up to the time of reaching the crumbly consistency, the material had been a wet, dense and nearly homogeneous mass, and was a fairly good conductor of heat. The rate of drying depended mainly on the degree of vacuum. But when the mass became crumbly and granular, it suddenly ceased to be a good conductor and became rather an insulator like sawdust. Under these conditions, the rate of drying was measured by the rather slow rate of heat conduction into the mass. What had been a very efficient method of drying by vacuum up to this sudden change in consistency, now became a very inefficient method. In fact, about as much time was required to reduce the moisture content from 40 per cent to the final 8 per cent as had been required to reduce it from 78 to 40 per cent, though evaporation of far more water was involved in the earlier part of the operation.

Consideration of the inefficiency toward the end of the process yielded a good solution of the problem. Since the material had to be transported to a grinder, and thence to a weigher and sacker, and since this was most conveniently done by pneumatic conveyor, it appeared easily possible to heat the air with which the meal was blown through the ducts, and to regulate the temperature and volume of air against the quantity of meal blown so that during the few seconds of passage through the ducts, the fine particles of meal would give up their excess moisture to the air and be cooled down in doing so through the heat absorbed in vaporization of the

A caster breaks . . . a load is dumped . . . production is lost . . . *a shipment delayed.*

Maybe you have never thought of it in this way, but a little caster can sometimes mean the difference between profit and loss on a day's production . . . the loss of a good customer, because of delayed shipment . . . extra cost because of an overtime run.

There are two ways to insure against such losses —(1) regular inspection of handling equipment; (2) replacement when due, with good, sound parts or complete units.

Service ForgeWeld Casters are designed for long service—hard service—efficient service. Outstanding strength lies in their drop-forged, structural steel construction—the frictionless action of the Hyatt bearing wheel, the ball bearing pin top plate (forged together in a single piece).

There is a Service Caster to meet every shop and price requirement, and you ought to find out about the 3 or 4 which fit your needs. Start now by writing for a full description of ForgeWeld.

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moisture. The rather inefficient vacuum drying had to be continued in the dryer from about 40 per cent moisture down to a point when the meal was light enough to be carried through the pneumatic conveyors, and the amount of remaining water low enough to be removed by blowing. It was found that at about 22 per cent moisture content the meal was "fluffy" enough to be blown through the ducts. This point could be arrived at in practice by measuring the time from the critical amperage drop that occurred when the mass crumbled. When this 22 per cent point was reached the batch was dumped and blown through the first pneumatic conveyor stage to the hammer mill. The conveyor air was drawn in through a steam heated unit heater in which its temperature was raised to about 180 deg. F., reaching the mill through a cyclone separator where the moist air was separated from the meal which now had about 14-15 per cent moisture. Here the meal was ground, and again picked up in a second pneumatic duct with a fresh supply of hot air drawn through a second unit heater and conveyed to the weighing and sacking room where it was again delivered through a second cyclone separator. The two stages of pneumatic conveying brought the moisture content from 22 to 8 per cent in a few seconds when two hours or more would have been necessary in the vacuum dryer.

Thus are troublesome plant problems solved by scientific method—study of pertinent facts, exercise of imagination in setting up hypotheses, checking and confirming hypotheses, drawing conclusions and prescribing the remedy.

Babassu Oil Menace Butter

(*Continued from page 615*)

be used as a shortening or butter-substitute, without hydrogenation. Most of the present production is so used domestically, in Brazil. The properties of babassu oil compare with coconut oil and palm kernel oil as follows:

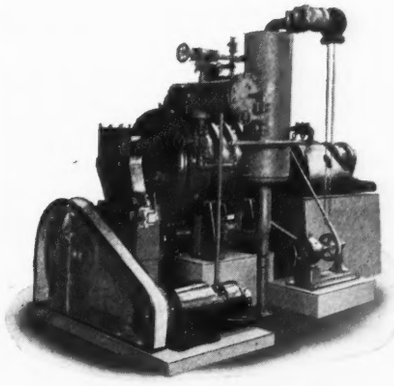
	Babassu	Coconut	Palm Kernel
Specific gravity at ▶100/15 deg. C.	0.868	0.926	0.873
Saponification Value	247–250	251–263	244–255
Iodine Number	14–16.3	8–9.6	16–23
Reichert-Meissl Value	5.8–6.2	6–8	4.8–7
Polenske Number	10.2–11.3	15–18	9.4–11
Melting Point	22 to 26 deg. C.	23 to 26 deg. C.	24 to 30 deg. C.
Titer	22.7 to 23 deg. C.	20.4 to 23.5 deg. C.	20 to 25 deg. C.

The oil which is prepared in Brazil is of very poor quality and cannot be sold in the United States.

Consequently, the most satisfactory method has proved to be the importation of the kernels and the extraction of the oil in the United States. Unfortunately, even here there are difficulties. Babassu kernels for import should be clean and sound. This is not, however, often the case. In Brazil, the natives gather the nuts that have fallen to the ground. The kernels are mostly removed at once, as this is more easily done when the nuts are fresh. As the kernels are removed by hand, by axes, they are often much damaged. This permits rapid decay. The nuts become moldy and the free fatty acid content of the oil goes up.

Babassu nuts have been a factor in Brazilian exports only since 1914. Germany was formerly the largest market, with other European countries taking much smaller quantities. The peak year in exports so far was 1923, when the total was over 35,000 tons. Table II shows exports of nuts to European ports from 1922 to 1935.

—and PAKICE



No reason why you need be staggered by the size of your ice bill every month. In fact, there is no reason why you should be dependent on outside sources for your requirements for product icing.

Simply do like so many others are doing. Install a Pakice Machine to make all the ice you need, when you need it and as you need it. No waste, more efficient icing or product cooling, and, what's more, 'twill save you a lot of money.

The Pakice Machine produces ice in either briquette or crystal form; with little attention.

It's well worth investigating!

Write THE VILTER MANUFACTURING COMPANY "SINCE 1887" 2115 South First St. MILWAUKEE, WISCONSIN Representatives in Principal Cities

BOOKS RECEIVED

THE DECLINE AND RISE OF THE CONSUMER. By Horace M. Kallen. Published by D. Appelton-Century Co., Inc., 35 West 32d St., New York, N. Y., 1936. 484+xx pp.; 6x8½ in. cloth; $2.75.

Regardless of individual or organization views Consumer Co-Ops are with us. Growing slowly and quietly since 1844, the Rochdale system of cooperative effort has become international in scope and is, at present, the theme of forum, editorial, and feature article discussions. Books on Consumer Cooperatives are also becoming quite numerous.

Before reaching a too definite conclusion on the wisdom or fallacy of Consumer Co-ops it is well to review the political, philosophical and economic relationships that have existed between consumers and producers from the days of primitive man to the present. Mr. Kallen has attempted such a review.

In addition he has made an analysis of three special fields in which consumer cooperation has special application. They are: money and credit, employer-employee relationships, and education. He also attempts a comparison of the Consumer Co-operative movement with Communism, Fascism, and Naziism.

Producers of today can better plan their business future if they know the consumer of tomorrow and how he is likely to be reached by their products. As an aid in the study of tomorrow's consumer Mr. Kallen's book is of value to food manufacturers.

AMERICAN CHAMBER OF HORRORS; By Ruth de Forest Lamb. Published by Farrar & Rinehart, Inc., 232 Madison Ave., New York, N. Y., 1936. 418+ XII pp.; 6x8½ in.; cloth; illustrated; $2.50.

Published as "the inside story of the Government's fight to protect consumers against dangers to health, life and pocket" this book emphasizes the need for an "up-to-date" food and drug law.

In fact, it is a handbook of case studies on patent medicine and cosmetic rackets; on questionable food packaging, labeling and advertising; and on lobbying activities by opponents to stringent new food and drug legislation. The author writes convincingly because of her former connection with large advertising agencies handling food and drug accounts and of her subsequent work in the Food and Drug Administration.

Renewed activity for the passage of a new food and drug bill by the incoming Congress will increase public interest in the contents of this book, which is dedicated to militant women's organizations sponsoring new legislation for the protection of food, drug, and cosmetic consumers.

THE POISON PEN OF JERSEY!; by Frank Dalton O'Sullivan. Published by O'Sullivan Publishing Co., 35 West Jackson Blvd., Chicago, Ill., 1936. 301 pp.; 6x8¾ in.; cloth; $2.75.

In his attempt to make reply to "muckraking" publications denouncing advertising and modern methods of producing and marketing foods, drugs, and cosmetics the author in fact has indulged in a tirade against Consumers' Research and its backers. The hysterical manner in which this defense of advertising and advertising agencies is presented arouses considerable suspicion that here is another case of "the pot calling the kettle black."

PATENTS

Fish in Brine Steamed, Drained of Free Liquid, Subjected to Dry Heat and Again Drained Preliminary to Canning — Edward David, Monterey, and Arno F. Schmidt, Pacific Grove, Calif., to Edward David. No. 2,055,230. Sept. 22, 1936.

Butter Packaged in Individual Service Pats—James L. Burke, Weehawken, N. J., to Eldorado Escalator Co., Union City, N. J. No. 2,055,333. Sept. 22, 1936.

Filled Chocolates Made by Mechanical Means—Jens Johannes Jensen, to Boggild & Jacobsen, Copenhagen, Denmark. No. 2,055,605. Sept. 29, 1936.

Doughnuts Made in Unit Comprised of a Forming Machine, Proofing Compartment and Cooking Vat—Frederick W. Scheibel, South Francisco, Calif. No. 2,055,639. Sept. 29, 1936.

Pies Formed Automatically—Elizabeth Moss, Roscoe, Calif. No. 2,055,726. Sept. 29, 1936.

Fruit Juice and Milk Processed to Give a Dry Product Mixture Having a pH of 3.1 to 3.9—Willard E. Baier, Ontario Calif. to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,055,782. Sept. 29, 1936.

Dried Fruit Packaged by Wrapping in Paper Coated With a Mineral Oil—Clifford B. Pape to California Fruit & Apricot Growers Association, San Jose, Calif. No. 2,055,800. Sept. 29, 1936.

Filtering Action Obtained by Building Filter Cake of Successive Uniform Layers in Continuous Spiral Formation on Retaining Walls—Fred W. Manning, Altadena, Calif., to F. W. Manning Co., Ltd., Los Angeles, Calif. No. 2,055,869. Sept. 29, 1936.

Liquids Expressed and Clarified in Hand-Operated Unit—Fred W. Manning to F. W. Manning Co., Ltd., Los Angeles, Calif. No. 2,055,871. Sept. 29, 1936.

Bottled Wine Mechanically Tilted and Turned During Aging—Henry G. Moore, Los Angeles and Edward L. Gonyer, Beverly Hills, Calif. No. 2,056,014. Sept. 29, 1936.

Spearmint Leaves Cured And Cut Into Size Suitable for Mixing With Cured Tea Leaves—Roe Stubbs Freeman to Estelle B. Reed, Atlanta, Ga. No. 2,056,065. Sept. 29, 1936.

Egg White Treated With a Fermented Alcoholic Culture for Separation of the Chalazae and Stringy Portions—Samuel Tranin, Kansas City, Mo. No. 2,056,082. Sept. 29, 1936.

Dried Milk Solids Mixed With Ground Grain and a Fatty Material for Preparation of Feed Composition in Pellet Form—Clarence E. Lee, Auburn, N. Y., to Beacon Milling Co., Inc., Cayuga, N. Y. No. 2,056,107. Sept. 29, 1936.

Ice Cream Charged With Compressed Gas During Freezing—Albert T. Light, Canton, Ohio, to York Ice Machinery Corp., York, Pa. Nos. 2,056,431 and 2,056,432. October 6, 1936.

Syrup Supplied to Vacuum Cooker in Manner to Prevent Deposit of Concentrated Mass on Filler Nozzle—Max Marc Guggenheim to Baker-Perkins Co. Inc., Saginaw, Mich. No. 2,056,516. Oct. 6, 1936.

Canned Foods Moved in a Direct Continuous and Rotating Manner Through Series of Heating and Cooling Zones at a Predetermined Rate of Speed—Alex R. Kennedy to Indiana Condensed Milk Co., Indianapolis, Ind. No. 2,056,526. Oct. 6, 1936.

Non-Hardening Salt Made by the Addition of the 0.05 to 3 Per Cent of Glycerine on Weight of Salt—Marnell Segura, Jefferson Island, La., to Jefferson Island Salt Mining Co., Louisville, Ky. No. 2,056,540. Oct. 6, 1936.

Yeast Grown in Wort Kept in Violent Agitation by Recirculation—Sigurd Jansen, Oslo, Norway. No. 2,056,576. Oct. 6, 1936.

Sweet Potato Chips Prepared by Cooking in Deep Fat—Byron C. Brunstetter, Washington, D. C., to the free use of the public. No. 2,056,884. Oct. 6, 1936.

Foods and Beverages Preserved Through Addition of Yerba Maté — Michael Angelo O'Callaghan, Buenos Aires, Argentina. No. 2,057,049. Oct. 13, 1936.

Vanillin Made From Ligno-Cellulose, Crude Lignin Extract and Lignin-Sulphonic Acids—Lloyd T. Sandborn, Jörgen Richter Salvesen and Guy Clemens Howard, Wausau, Wis., to Marathron Paper Mills Co., and Guy C. Howard Co., Rothschild, Wis. No. 2,057,117. Oct. 13, 1936.

Edible Colloidal Solution Added to Cider in Course of Vinegar Manufacture—Eugene G. Grab to Food and Fruit Industries, Inc., Winchester, Va. No. 2,057,144. Oct. 13, 1936.

Frozen Confection Molded to Have Handle of Spirally Wound Flexible Material—Severt M. Fatland, Bremerton, Wash. No. 2,057,297. Oct. 13, 1936.

Beer Given Quick Aging Through Pressure Homogenization and Clarification—Cornelius V. Werner, Richmond Hill and Carl Schreiner, Brooklyn, N. Y., to Charles J. Werner, Trustee, Richmond Hill, L. I., N. Y. No. 2,057,352. Oct. 13, 1936.

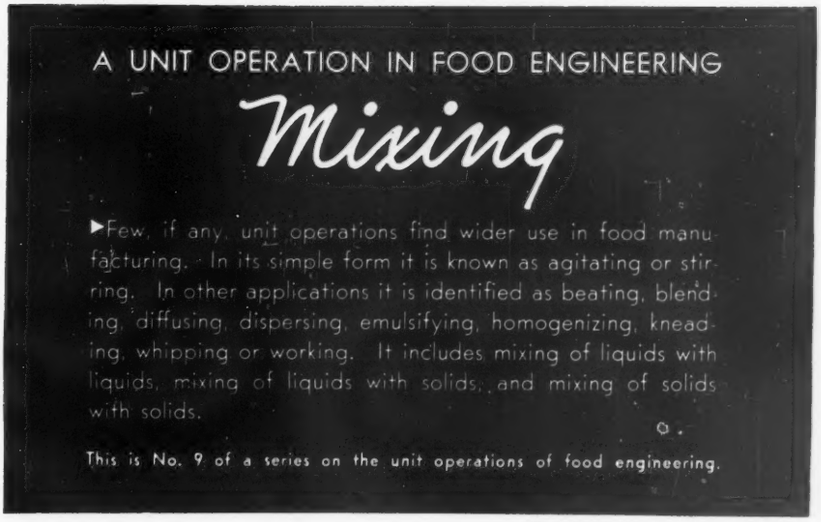
Peas and the Like Washed and Blanched During Passage Through Conduit While Suspended in Heated Liquid and With Rate of Flow Retarded by the Propellor-Induced Back Pressure—Frank D. Chapman, Berlin, Wis. No. 2,057,366. Oct. 13, 1936.

Yeast Given Antirachitic Activation by Treatment with Ultra-Violet Rays—Harry Steenbock to Wisconsin Alumni Research Foundation, Madison, Wis. No. 2,057,399. Oct. 13, 1936.

Meat Extracted With Water Acidified at a Definite Hydrogen-Ion Concentration — Elton R. Darling to Chappel Bros. Inc., Rockford, Ill. No. 2,057,479. Oct. 13, 1936.

MIXING...
A Unit Operation Seldom Discussed But Widely Used

PART I


A UNIT OPERATION IN FOOD ENGINEERING
Mixing
▶Few, if any, unit operations find wider use in food manufacturing. In its simple form it is known as agitating or stirring. In other applications it is identified as beating, blending, diffusing, dispersing, emulsifying, homogenizing, kneading, whipping or working. It includes mixing of liquids with liquids, mixing of liquids with solids, and mixing of solids with solids.
This is No. 9 of a series on the unit operations of food engineering.

I—*What Mixing Is*

MIXING in some of its several phases enters into the preparation and handling of nearly every food. Yet, there is very little data on just what does take place during mixing operations.

Mixing seems to be a simple operation. A woman in a kitchen with a bowl and a spoon or a chemist with a laboratory dish and a glass rod may combine two or more food materials to get a product which appears to be of uniform composition throughout the mass. Examination of samples of these products under a microscope will very likely show otherwise. Closer study will prove that duplicates of either mix from other lots of the same ingredients and handled in the same way will be almost impossible to obtain no matter with what care and skill the mixing operations are carried out.

Results of mixing operations done under factory or large scale conditions are even less predictable. This condition exists because there is no generally recognized theory explaining the operation of mixers or what takes place in the mass during mixing operations.

Plants operating under the supervision of well-trained and experienced chemical engineers have made attempts to work out a technic of operation which will give them control over their mixing operations. In the case of dry mixing a product of three or more granular ingredients of differing specific gravity, it has been observed that continued operation of the mixer after definite rhythmic periods of time is more likely to cause a partial "unmixing" of the various ingredients differing in density and particle size than it is to bring about thorough mixing.[1]

This is particularly important in industries which put out a product that is used in small quantities yet requiring uniform composition of mixture. Examples are found in baking powder, dessert and beverage powders and drugs.

ADD to this peculiarity of behavior the difficulties which arise because of the many different types of equipment used for mixing purposes, and it becomes more understandable why there is so little known about mixing as an operation. For good measure take into account the variations in the physical properties of the ingredients used. Since wide variations in these properties do exist there are good reasons for the unpredictable results that any mixer is likely to give with different types of food products.

Mixing as a unit operation is more than the stirring together of two or more ingredients to form a product with supposedly uniform composition.

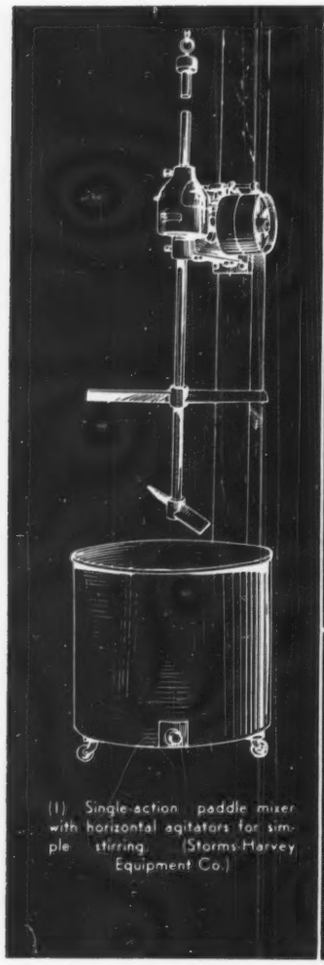
Definition of the term as used in food engineering includes agitating, stirring, beating, blending, diffusing, dispersing, emulsifying, homogenizing, kneading, whipping and working. These phases of mixing cover mixing solids with solids, combining solids and liquids, and mixing liquids with liquids.

When solids are mixed with solids the operation is essentially one of blending. The mixture is obtainable by agitating, stirring, and even working as in the case of making dry prepared mixes containing shortening. When solids are combined with liquids or vice versa the operations vary from the extreme of simple stirring or agitating to the other extreme, kneading which is necessary in the preparation of bread doughs. Whipping, homogenizing, emulsifying and working play their role depending in part upon the ratio of liquids to solids in the composition of the mass and in part upon the type of finished product desired, such as salad dressings, cake batters, and cocoa-milk drinks. In this group of operations fall the making and handling of pastes. In consistency the pastes range from vegetable purees to macaroni doughs; from near-liquids to stiff plastic masses. Chemical reactions are likely to take place at some stage of the mixing operation but they are not a part of mixing which is strictly mechanical in character.

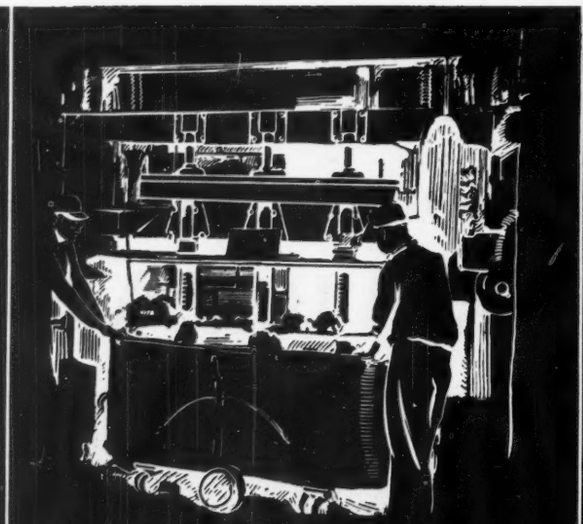
When liquids are mixed with liquids a very different action from mixing solids with solids takes place. The operation may be one of blending, diffusing, dispersing, emulsifying or homogenizing in which agitating, beating, stirring or whipping may be used in part or throughout the mixing operation. Air or other gases may be components of the mixes in definite proportions as is true in emulsions and marshmallows. Here again chemical reactions may take place but they are results, not a part of the mixing operations.

The object of mixing is to obtain at least one of four results: 1. To obtain a physical mixture of two or more components which do not ordinarily separate when once mixed. Examples of such mixtures are: (*a*) flavoring syrup, color solution and water (liquids in liquids); (*b*) blended flours or flour and powdered sugar (solids and solids); and (*c*) flour and melted shortening (solids and liquids without change in particle size). 2. To pro-

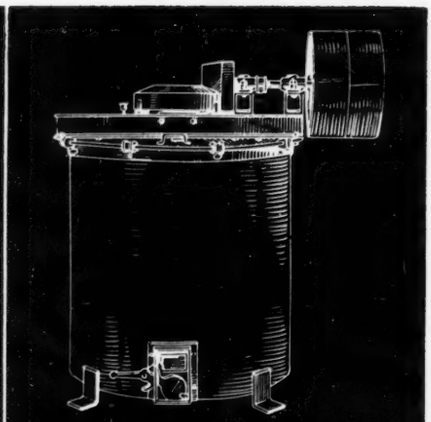
[1] FOOD INDUSTRIES, October, 1933, p. 390.



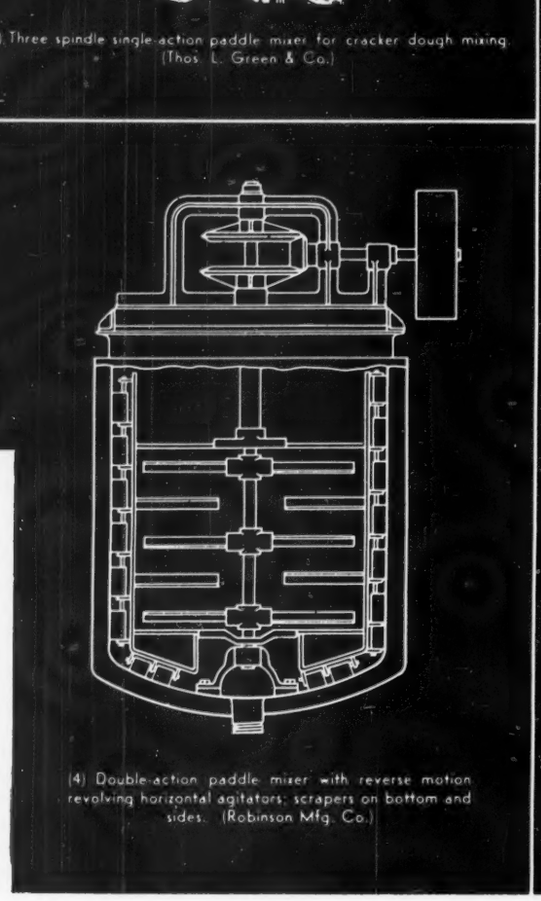
(1) Single-action paddle mixer with horizontal agitators for simple stirring. (Storms-Harvey Equipment Co.)



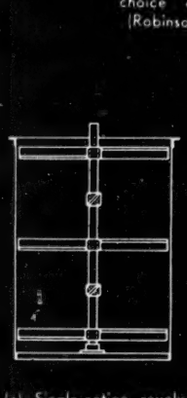
(2) Three spindle single-action paddle mixer for cracker dough mixing. (Thos. L. Green & Co.)



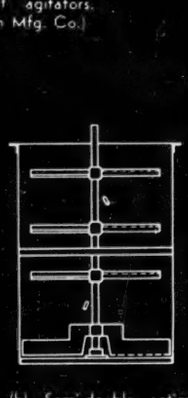
(3) Paddle mixer with choice of agitators. (Robinson Mfg. Co.)



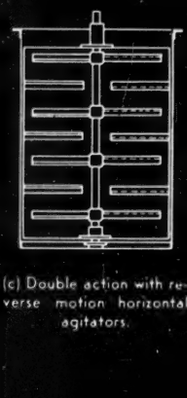
(4) Double-action paddle mixer with reverse motion revolving horizontal agitators; scrapers on bottom and sides. (Robinson Mfg. Co.)



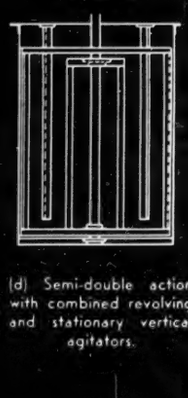
(a) Single-action revolving horizontal agitators.



(b) Semi-double action with combined revolving and stationary horizontal agitators.



(c) Double action with reverse motion horizontal agitators.



(d) Semi-double action with combined revolving and stationary vertical agitators.

duce a non-settling or non-separating mixture of two or more components which ordinarily separate into layers or strata if not kept in constant motion. Examples of such emulsions or suspensions are: (*a*) mayonnaise or essential oil flavor emulsion (liquid in liquid); (*b*) homogenized cocoa-milk drink (solids in liquid) 3. To produce a physical change. Example of such a mixture is a sugar solution (solid and liquid with change in particle size); and 4. To speed up reaction. Example of such mixture (*a*) bakery doughs (solid and liquid); (*b*) ice cream or pasteurized milk (liquid and liquid to hasten temperature transfer; not homogenization).

TO get these four results equipment ranging from the simplest of stirring devices to the highly intricate colloid mill or homogenizer is used. Pressures and vacuums may or may not be used. Heat or refrigeration may or may not be applied. Air or other gases may or may not be excluded from contact with the mixtures. These factors merely define the conditions under which the mixing operations are carried out. There are cases where air or other gases are the agitating or mixing agents but they will not be dealt with in this discussion, which for the lack of space must be confined to those mixers most commonly used in food manufacture.

Even with the arbitrary limitations we have placed on this introductory discussion of mixers the subject is too extensive to handle in a single article. In this article only the less intricate types of mixers will be handled. Homogenizers, emulsifiers, colloid mills, and mixers for doughs, heavy pastes, and similar mixtures of solids and liquids will be discussed in Part II.

More extensive discussions of mixing and of the factors influencing the carrying out of the operation are found in the chapter on "Mixing of Material" by Gordon MacLean in "Chemical Engineers Handbook," in "Elements of Chemical Engineering" by Badger and McCabe and in William Clayton's "Theory of Emulsions."

II—*What a Mixer Is*

From what we have said about mixing as a unit operation it is evident that mixing defies definition in simple, clean-cut terms. So does the mixer, the means by which mixing is accomplished.

To say that a mixer is a machine or de-

vice used in mixing tells little. To say that it is a specialized form of equipment for handling materials tells less. Yet, a mixer is just that because the desired end product is not obtained unless the ingredient materials—liquids or solids—are moved about to bring the particles of each component into intimate contact with particles of each of the other components.

HOWEVER, an important point to keep in mind is that mere movement of the ingredient materials seldom results in thorough mixing. The movement must be such that each component part of the mixture is distributed evenly throughout the mass. This means that the distribution must be made in such a manner that any portion of the end product is as near identical with every other portion as is possible to get if the mixing is done well; a result very difficult to obtain. Chemical analysis and microscopic examination offer best means of checking on mixture uniformity.

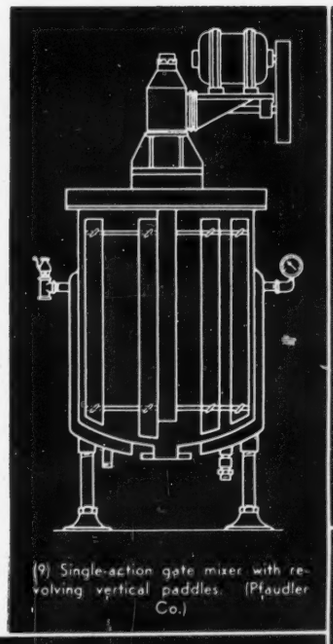
In the effort to get a perfect mix the movement of the materials may be gentle or violent and the equipment used to produce the movement may be simple or complex. Nevertheless there must be movement of the materials and there must be a means of producing the movement if a mixing action is to be obtained.

The machines or devices which impart the movement or mixing action are the mixers. In general, the design and construction of these devices are the result of trial and error to get a mechanism which will give: 1, The degree of mixing desired; 2, The type of motion which will bring each portion of the mass being mixed into intimate contact with every other portion of the mixture; 3, A uniformity in rate and direction of motion to give a satisfactory mixture in the shortest time at reasonable cost in power. The most recent development in the design and construction of mixers is to make a detailed research laboratory study of the mixing problem to be solved. On the basis of the data obtained in this manner a mixer is designed for the specific job.

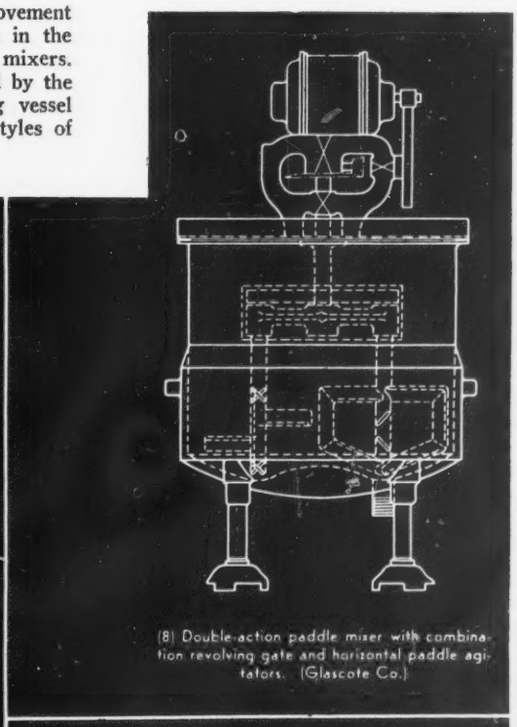
Expressed in general terms the devices which give the mixing movements are stirrers or agitators attached to, built into or operated in vessels which contain the materials being mixed and confine or direct them to the zone or zones in which the stirrers or agitators operate.

The design and construction of these vessels are as important as the design, construction, and operation of the stirrers and agitators. For this reason the term "mixer" is used to designate the agitating device and the containing vessel as a unit. However, the design of the stirring or agitating device generally identifies the mixer as to type. Examples are propeller mixers, spiral mixers, arm mixers, paddle mixers and turbine mixers. Such identification is not without exception. There are mixers in which the mixing action is obtained through movement of the containing vessel itself as in the case of the tumbling or revolving mixers. Other times the mixer is identified by the shape or design of the containing vessel in which may operate numerous styles of replaceable agitating devices. The vertical bowl mixer commonly used for cake, confectionery, icing and mayonnaise making is a widely used example of such a mixer. Homogenizers and colloid mills are complex highly specialized machines which might not be regarded strictly as "mixers." Yet they are mixers in the sense that they bring about a more uniform distribution of ingredient components, in rough-mix systems of liquids in liquids or of small amounts of solids in liquids, than is obtained without their use.

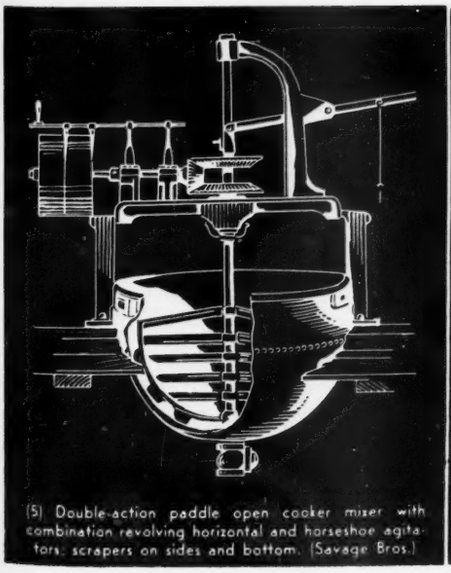
JETS, injectors, centrifugal pumps and similar devices so useful to the chemical engineer also serve the food engineer as



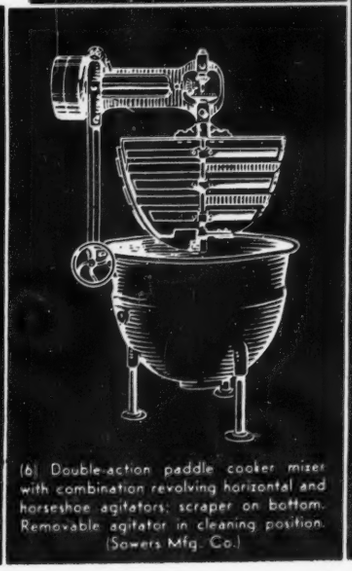
(9) Single-action gate mixer with revolving vertical paddles. (Pfaudler Co.)



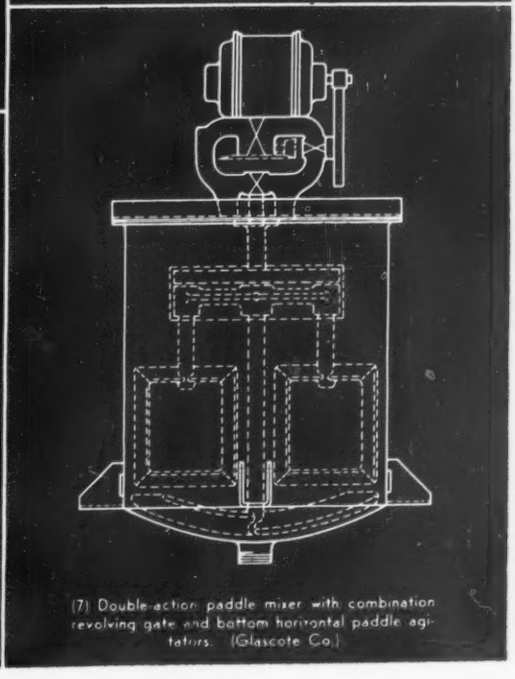
(8) Double-action paddle mixer with combination revolving gate and horizontal paddle agitators. (Glascote Co.)



(5) Double-action paddle open cooker mixer with combination revolving horizontal and horseshoe agitators; scrapers on sides and bottom. (Savage Bros.)



(6) Double-action paddle cooker mixer with combination revolving horizontal and horseshoe agitators; scraper on bottom. Removable agitator in cleaning position. (Sowers Mfg. Co.)



(7) Double-action paddle mixer with combination revolving gate and bottom horizontal paddle agitators. (Glascote Co.)

mixers under special conditions. They have the common virtue of being simple in construction, inexpensive in first cost and operation, and easy to use where they can be used.

On the basis of design, mixers for food manufacture may be classified as: (*a*) tumblers, (*b*) paddles, (*c*) propellers, (*d*) turbines, (*e*) spirals, (*f*) jets or sprays, (*g*) miscellaneous or special. These classes may be widely subdivided to cover as many as 25 to 30 types actually used. With them playing such an important part in food manufacture or processing, it is essential that the right type of mixer be selected.

Those illustrated or discussed in this article do not include all types available. They do represent those commonly used.

III—*Mixer Selection*

Before any one of the numerous types of mixers is selected to do a food mixing job a certain knowledge should be had concerning the job to be done.

Some of the questions to be answered are:

1. Is the mixture liquid, dry, or a paste?
   (*a*) Is it fluid or viscous?
   (*b*) Is it granular or powdery?
   (*c*) Is it plastic or gummy?
2. Will the components mix easily?
   (*a*) Do they have the same specific gravity?
   (*b*) Do they have the same particle size?
   (*c*) Are the solids easily wetted or dissolved by the liquids?
   (*d*) Do the liquids mix well with each other?
   (*e*) Does heat or refrigeration have to be applied?
   (*f*) Does the viscosity or fluidity of the mixture change during mixing?
3. In what proportions do the components make up the mixture?
4. In what order is each component added to the mixture and what is the effect if the order of addition is changed?
5. Is the operation a batch or a continuous one?
6. Is the mixture a final product or an intermediate raw material?

Answers to these and similar questions will aid in determining: First, the type of mixer which will give and maintain the kind of material movement required. Second, the shape and size of the containing vessel as well as the type and size of agitator needed. Third, the speed needed for the agitator to set up and maintain the desired movement. Finally, the length of time the material movement will have to be maintained to get a satisfactory mix.

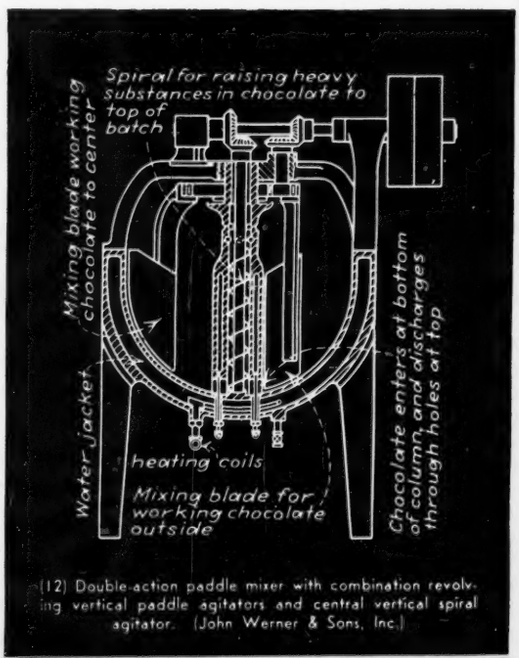
Paddle Mixers

Just as the woman in the kitchen makes use of her bowl and spoon and the chemist his beaker and stirring rod, the food manufacturer makes widest use of the type of mixer best known to him.

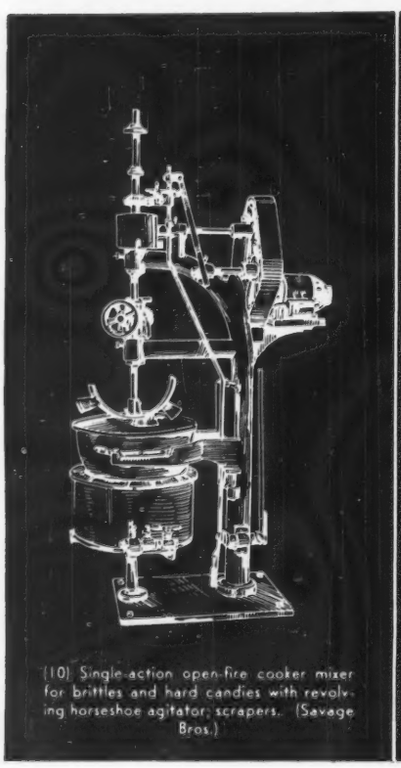
Because the paddle type mixer is the oldest and best known, it is the one most widely used. Also paddle mixers are among the simplest in construction; often made in the plant where used. Their first cost is low and in many cases they do the job well. As illustrated in Figs. 1 to 3 they can be had in a variety of simple forms for mixing liquids, pastes of moderate consistency, and low-gravity solids at slow speed. For such use the paddles or agitator blades may be flat or set at an angle to give an up and down or a to and from the center movement of the mixture or a combination of these movements.

Mixers of the type shown in Fig. 3 are used for mixing syrups, salad oils and dressings, light soups, flavorings, purees, and similar liquid and light paste foods. The single action agitators are used for gentle stirring. The semi-double and double-action agitators give more vigorous motion to the mixture and are preferred when the mixers are jacketed and used for heated or cooled mixing.

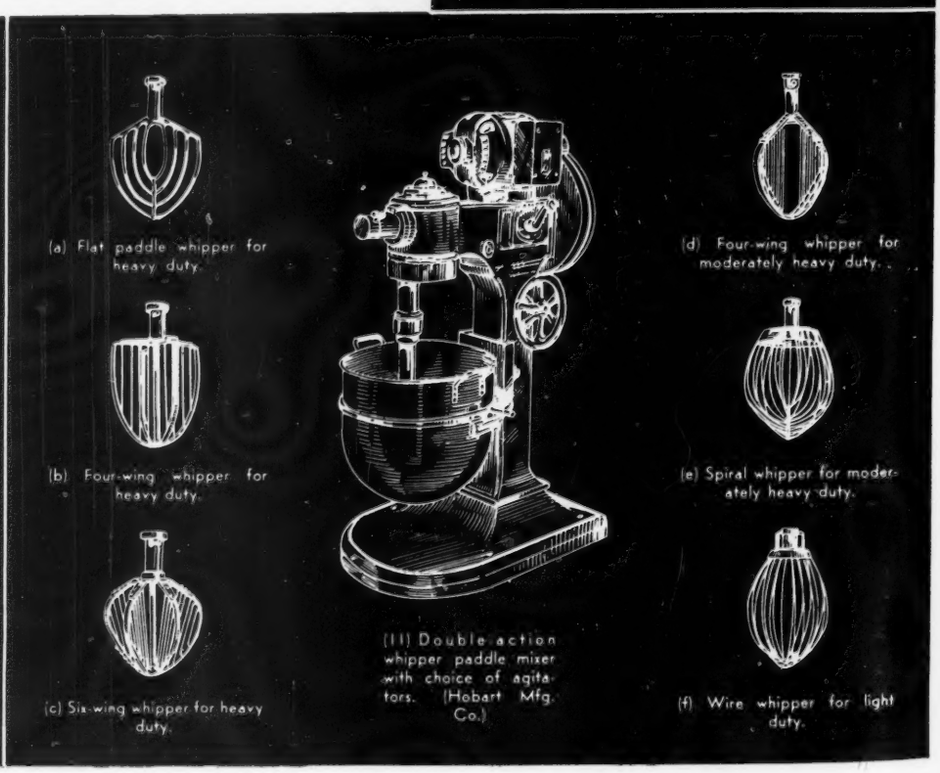
Other types of paddle mixers are represented by Figs. 4 to 17 with variations


Spiral for raising heavy substances in chocolate to top of batch
Mixing blade working chocolate to center
Water jacket
heating coils
Mixing blade for working chocolate outside
Chocolate enters at bottom of column and discharges through holes at top

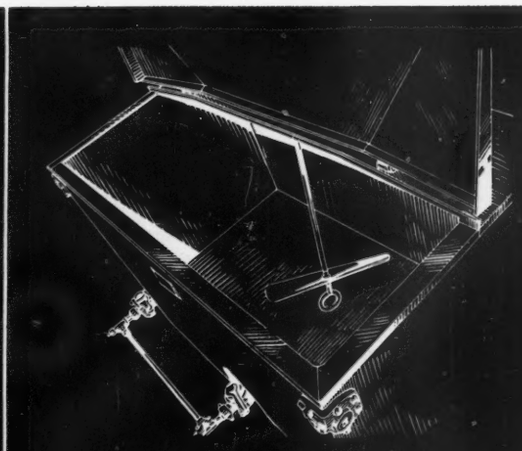
(12) Double-action paddle mixer with combination revolving vertical paddle agitators and central vertical spiral agitator. (John Werner & Sons, Inc.)



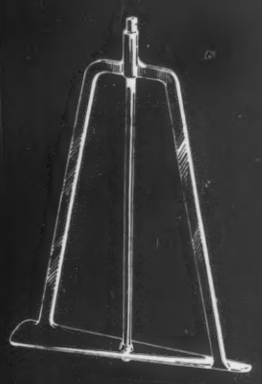
(10) Single-action open-fire cooker mixer for brittles and hard candies with revolving horseshoe agitator scrapers. (Savage Bros.)


(a) Flat paddle whipper for heavy duty.
(b) Four-wing whipper for heavy duty.
(c) Six-wing whipper for heavy duty.
(11) Double-action whipper paddle mixer with choice of agitators. (Hobart Mfg. Co.)
(d) Four-wing whipper for moderately heavy duty.
(e) Spiral whipper for moderately heavy duty.
(f) Wire whipper for light duty.

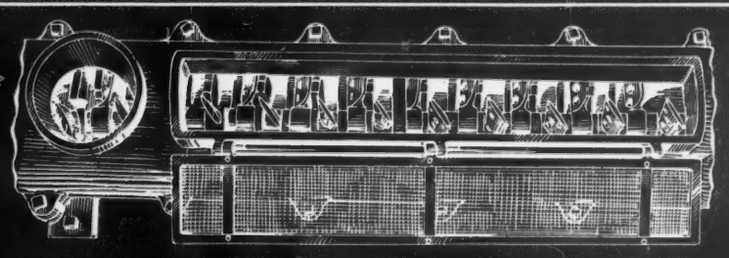
(13) Single-action paddle mixer with revolving open-top gate agitators suspended from pivot on top of central drive shaft for chocolate mixing. (J. W. Greer Co.)



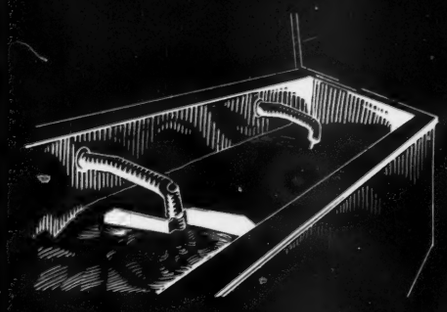
(14) Single-action paddle mixer with curved blade horizontal bottom agitator. (Cherry-Burrell Corp.)



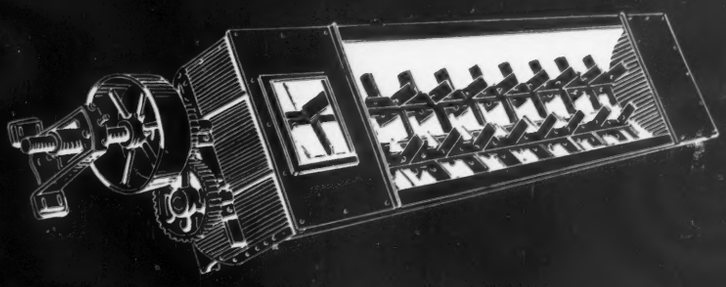
(a) Special paddle for cultured buttermilks and cocoa-milk mixtures.



(16) Horizontal paddle mixer with rotating intermeshing finger-blade agitator for fondant beating; continuous operation. (John Werner & Sons, Inc.)



(15) Oscillating-action paddle mixer with bottom-pivoted vertical agitators for ice cream mixtures. (Cherry-Burrell Corp.)



(17) Horizontal conveyor type paddle mixer for dry and semi-liquid mixtures with two rotating, intermeshing finger-blade agitators; continuous operation. (Sprout Waldron & Co., Inc.)

in construction of the agitators and of the containing vessel or trough. When the mixing is done with the application of heat or cooling the agitators are fitted with scrapers or are of horseshoe or anchor design to prevent caking or local overheating. When the mixing action is also one of beating (Fig. 16) or continuous blending (Fig. 17) the paddles have the form of intermeshing fingers to get the maximum mixing action possible in a short space of travel by the mixture.

The gate style of agitator is a variation of the paddle mixer which gives a sweeping motion to the mixture and adds a factor of sturdiness to the agitator.

Paddle mixers of the types represented by Figs. 4 to 10 come in for a great variety of uses in connection with the making of soups, syrups, sauces, salad dressings, meat and vitamin extracts, caramel colorings, chewing gum and candies; the rendering, melting, blending and tempering of fats; and the cooking of meats, meat and cereal mixtures, and starch pastes. They may be had with or without covers.

Mixers using the whipper style of paddle (Fig. 11) set up a localized swirling motion as well as an overlapping intermixing movement to the mixture. This type of mixer is widely used for mixing batters and making mayonnaise, icings, marshmallow whips and sponges. Other styles of this mixer will be shown when dough mixers are discussed in Part II of this article.

Propeller Mixers

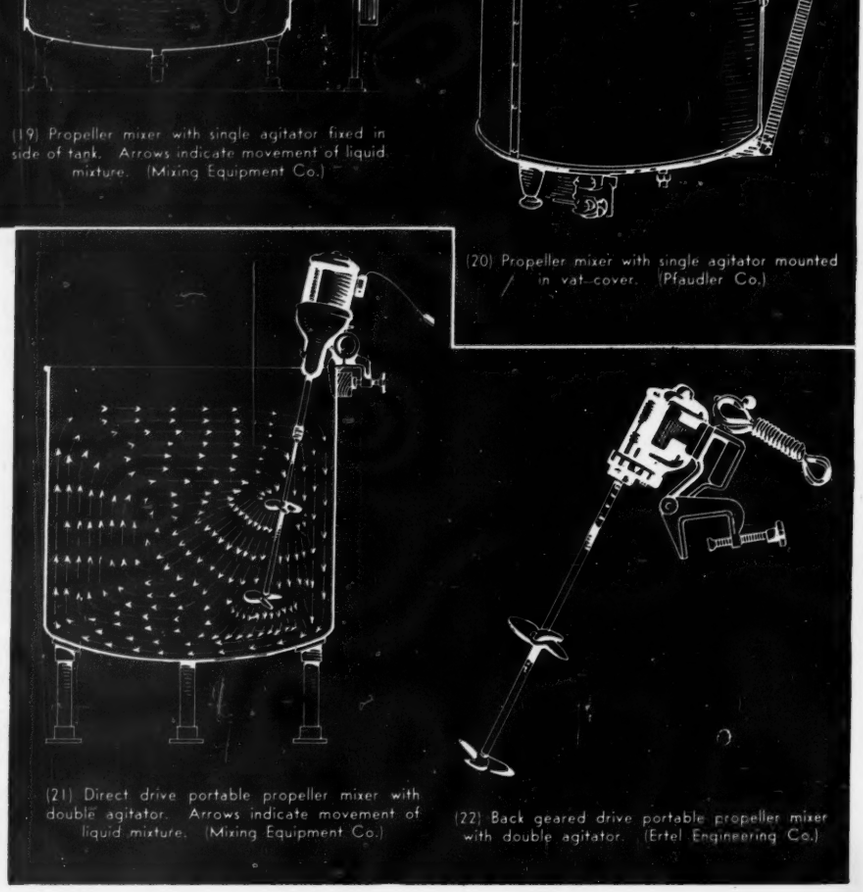
Propeller mixers are essentially high-speed mixers. They are used primarily with liquids having a consistency not to exceed that of molasses or strained honey at normal room temperatures. However, they are also used for mixtures containing a low percentage of solids in suspension.

These mixers may be of single or double-blade designs as shown in Figs. 18 to 22. Also they may be portable from one mixing vessel to another or fitted into the sides or tops of the mixing vats as stationary units. They may be operated through any angle between the vertical and the horizontal to give a variety of movements to the mixture. If located off the center of the containing vessel they produce a highly effective mixing action even in tanks or vats containing thousands of gallons of liquid milk, fruit juices, vegetable oils, or sugar syrups. When light powdery materials such as starch or low-fat cocoa powder are to be stirred into a liquid the propeller is set in the mixing vessel to cause the formation of a vortex which will draw the powder to the agitator so that it can be distributed through

(18) Portable propeller mixer with single agitator adjustable to any angle. (Storms-Harvey Equipment Co.)

(19) Propeller mixer with single agitator fixed in side of tank. Arrows indicate movement of liquid mixture. (Mixing Equipment Co.)

(20) Propeller mixer with single agitator mounted in vat cover. (Pfaudler Co.)



(21) Direct drive portable propeller mixer with double agitator. Arrows indicate movement of liquid mixture. (Mixing Equipment Co.)

(22) Back geared drive portable propeller mixer with double agitator. (Ertel Engineering Co.)

the liquid and not float on the surface. These mixers are available in propeller speeds ranging from 400 to 1,750 r.p.m. for plant use.

Turbine Mixers

Use of turbine mixers in food plants is a comparatively new practice. They find their best application in the mixing or blending of liquids ranging from low to high viscosities. When the mixture is one of low to medium viscosity the simple type (Fig. 23) is used. The force with which the liquid strikes the sides of the containing vessel and is deflected upward sets up an active stirring movement throughout the mixture. For liquids, suspensions or emulsions of high viscosities, two or more turbine impellers are used with stationary deflecting blades as shown in Fig. 24.

In construction the turbine mixer impellers are quite similar in design to the impellers in centrifugal pumps. Fig. 25 illustrates the use of a centrifugal or simple turbine pump to drive a stream of liquid into the containing vessel with sufficient force to set up a swirling motion, which serves as a means of speeding up solution of solids in liquids and keeping non-soluble solids in suspension.

In addition to their use in solution making, fat and oil hydrogenation, and oil blending, turbine mixers serve as emulsifiers in salad dressing manufacture and as mixers in starch paste cooking and cooling.

Revolving or Tumbling Mixers

Thorough mixing or blending of free-flowing materials is quite often obtained without the use of an agitator or similar stirring device operating inside the containing vessel portion of the mixer. In such cases the agitating force is applied to the vessel itself to give a revolving, rotating or tumbling motion. There may be ribs, baffles or even loose objects inside the mixer which help to direct the movement of the mixture to give a uniform distribution of the components throughout the mass. However, these devices cannot be considered as stirrers or agitators. Examples of this type mixer are represented by Figs. 26 to 30.

Use of the rotating pan as a mixer is secondary and confined largely to the confectionery industry where it is primarily used for coating and polishing purposes.[2] The tumbling barrel is as its name implies—a barrel-shaped container which revolves end over end on a horizontal axis. When of chemical stoneware construction, it is used for mixing or blending spices, condiments and flavoring extracts, flavoring mixtures, essential oils, beverage syrups and sauces which have chemical reacting properties. Except in the case of the cylindrical churn for margarine and dairy butter, the revolving cylinder is more often used as a combination mixer and grinder than solely as a mixer and is commonly known as a ball or pebble mill. Tumbling prisms may be cubical, hexagonal or octagonal in shape and mounted so as to give an end-to-end movement as well as a rolling movement to the mixture. In addition to their use for blending or mixing dry, granular, or flaky free-flowing materials they, especially the cubical prism, are used as churns.

Spiral Mixers

Spiral mixers, like paddle mixers, are quite widely used throughout the food manufacturing industry. Unlike the paddle mixers, which find greatest use in connection with liquids and light pastes, the spiral mixers get their widest use in connection with solids. In some cases liquids are components in the mixture and in other instances the mixture is liquid

[2] Food Industries, May, 1934, p. 198.

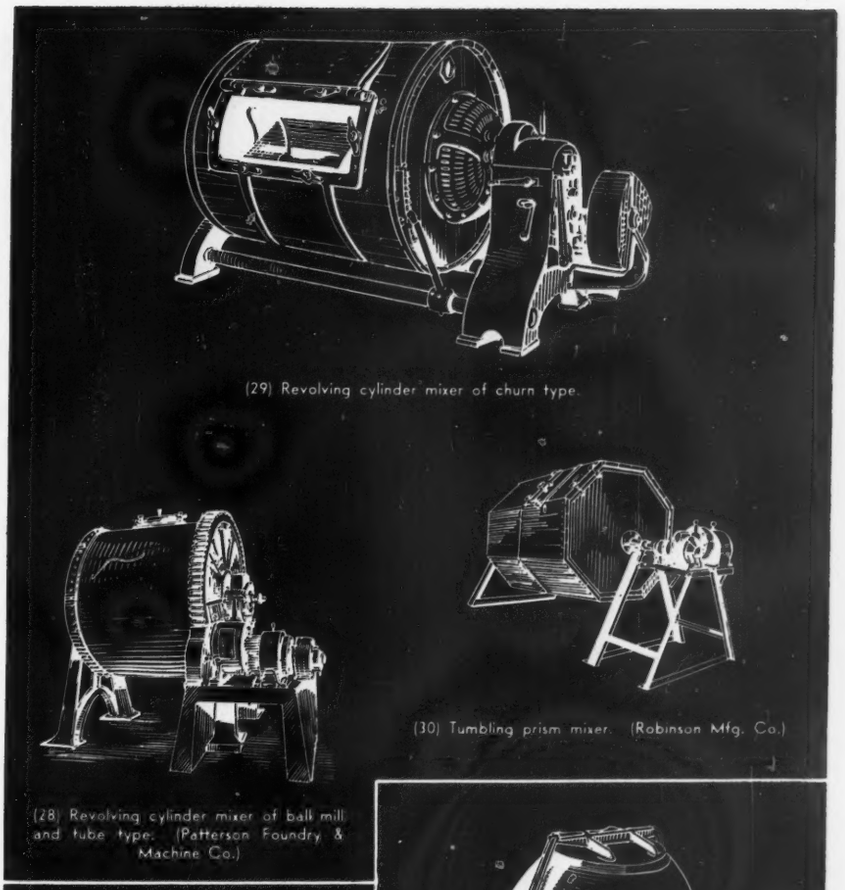
for example pasteurized milk. (Fig. 40.)

The agitators may be full spirals, broken spirals, combination of spirals and paddles, or a combination of spirals, trowels and paddles as shown in Figs. 31 to 39. As a rule they operate through the horizontal plane but when used as blending mixers for highly granular materials such as grains or coarse meals they may operate vertically.

EXCEPT in the case of their use as mixing conveyors, primarily, the purpose of the spiral mixer agitators is to set up bottom to top and cross-current as well as end-to-end movements in the mixture. These movements are obtained by pitching an inner spiral or sets of paddles to direct the flow of materials in a direction opposite to that directed by the outer spiral and in an upward and downward direction as well as a longitudinal direction. These double-direction mixers are used particularly in the preparation of leavening powders, self-rising flours, cocoa-sugar-milk powders, and mixtures containing small percentages of liquids which must be uniformly distributed throughout the mixture. They also are used for thin pastes. When a liquid such as shortening is being added to a prepared mix, the trowel type of combination agitator (Fig. 34), serves the useful purpose of spreading or smoothing out lumps against the sides of the mixer to assure uniform distribution of the fat, even though it may be in a plastic state, throughout the mixture.

Spiral mixers may be jacketed for heating or cooling and may have a more cylindrical-shaped shell than shown in the illustrations. Also spiral mixers, usually the cylindrical style, are used for the mixing of heavy soups, mincemeat, chocolate coatings, custards, meringues, sauces, and similar semi-liquids.

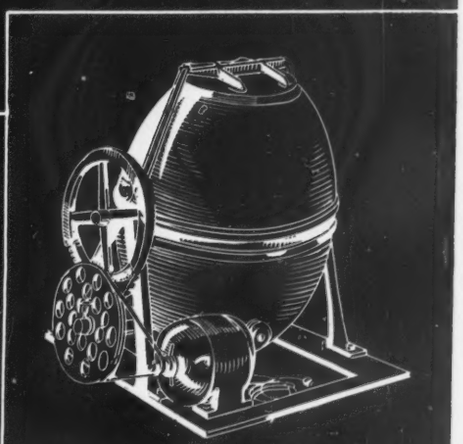
THROUGHOUT this discussion no attempt has been made to be exhaustive in



(29) Revolving cylinder mixer of churn type.

(28) Revolving cylinder mixer of ball mill and tube type. (Patterson Foundry & Machine Co.)

(30) Tumbling prism mixer. (Robinson Mfg. Co.)



(27) Tumbling barrel mixer. (United States Stoneware Co.)

(23) Simple turbine mixer. (Patterson Foundry & Machine Co.)

(24) Turbine mixer with stationary deflector. (Turbo-Mixer Corp.)

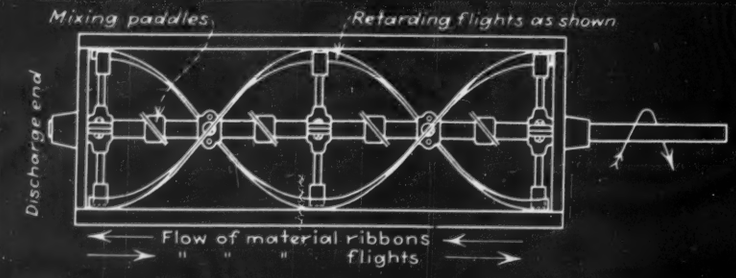
(25) Centrifugal pump driven jet mixer. (American Bakers' Machinery Co.)

(26) Revolving pan mixer.

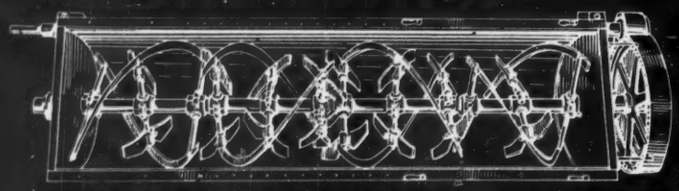
the treatment of mixing as an operation nor of mixers in their design and uses. Instead, our aim has been to present an introductory treatment of mixing and mixers which will be helpful to the plant man who uses mixing as an operation.

Manufacturer identification of the mixers used as illustrations signifies the source of our illustrative material and should not be taken as the identity of the only company making that type of mixer.

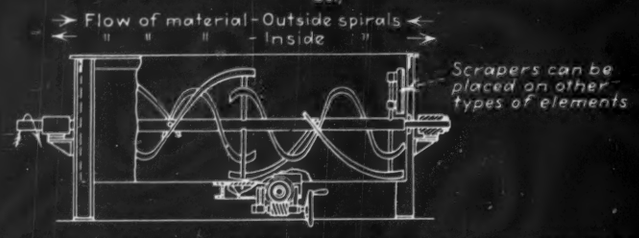
Part II of this discussion will include homogenizers, emulsifiers, colloid mills, and mixers for doughs or heavy pastes.



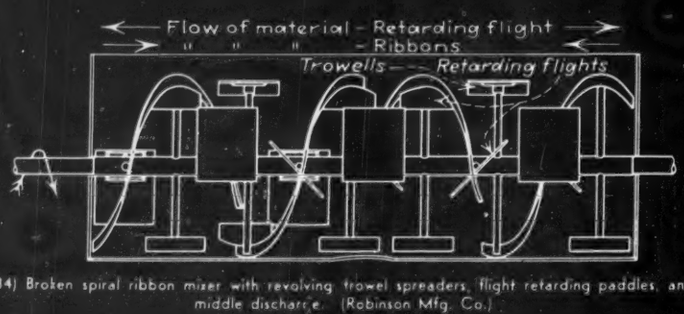
(31) Full spiral ribbon mixer with paddles and end discharge. (Robinson Mfg. Co.)



(32) Broken spiral ribbon mixer with adjustable paddles and middle discharge. (Robinson Mfg. Co.)

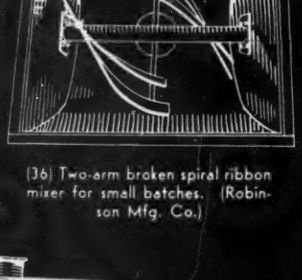


(33) Broken spiral ribbon mixer with end scraper and middle discharge. (Robinson Mfg. Co.)

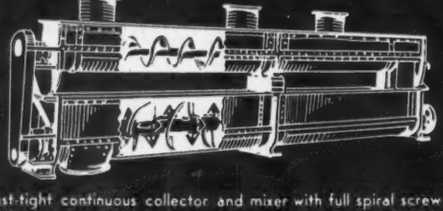


(34) Broken spiral ribbon mixer with revolving trowel spreaders, flight retarding paddles, and middle discharge. (Robinson Mfg. Co.)

(35) Double-spiral ribbon mixer; one ribbon full spiral; other broken spiral; center discharge. (Robinson Mfg. Co.)

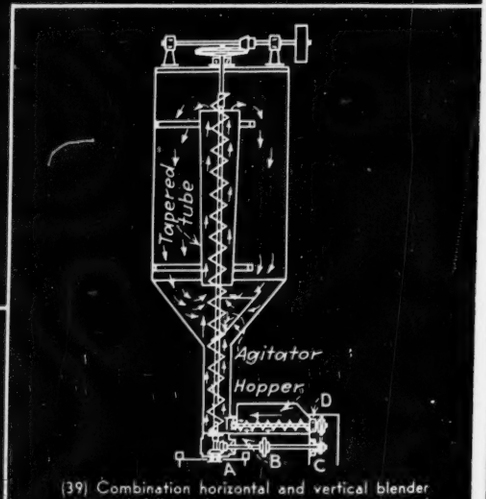


(36) Two-arm broken spiral ribbon mixer for small batches. (Robinson Mfg. Co.)

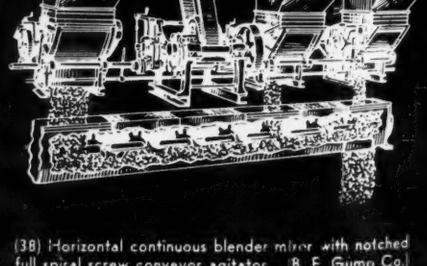


(37) Horizontal dust-tight continuous collector and mixer with full spiral screw and combination paddle and broken spiral ribbon conveyor agitators. (Sprout, Waldron & Co.)

(40) Horizontal pasteurizer mixer with revolving full spiral coil heater agitator. (Cherry-Burrell Corp.)



(39) Combination horizontal and vertical blender mixer with full spiral screw conveyor agitator and revolving paddle mixing agitators. (S. Howes Co., Inc.)



(38) Horizontal continuous blender mixer with notched full spiral screw conveyor agitator. (B. F. Gump Co.)

but A KEYHOLE VIEW ISN'T ENOUGH FOR ACCURATE THERMOMETER READINGS

Taylor Engineers developed "BINOC" tubing so that you and your employes can get a wide-open-door view of your industrial thermometers and make easier, quicker and more accurate readings. Ask for an immediate demonstration.

JOHNNY isn't particular. If the door is locked, a keyhole will do for a Christmas Eve peek.

But what satisfies Johnny, doesn't satisfy you and others who are producing high quality food products. You want more than a limited view . . . more than a one-eyed squint at the temperatures that have so much to do with food qualities.

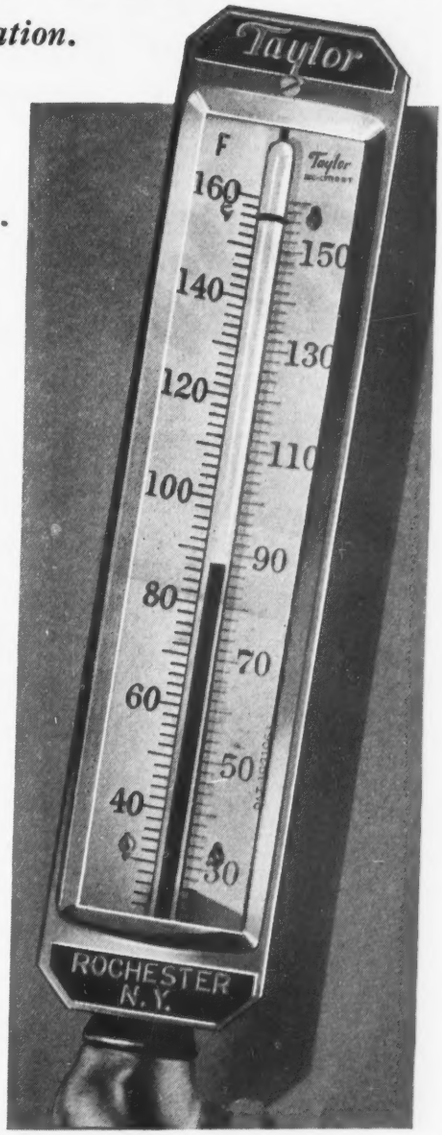
Taylor Engineers with "BINOC" Tubing can now assure an open-door view of temperatures when industrial thermometer readings are taken.

"BINOC" is a radically different tubing in construction. And in results—in visibility and readability—it is in a class by itself. It makes Taylor Industrial Thermometers the easiest-to-read instruments of their type. If you have been conscious of the narrow angle of vision, the limited visibility, of previous glass thermometers, you will appreciate instantly the advantages of "BINOC" Tubing.

JUST REMEMBER THESE POINTS: Taylor "BINOC" Tubing more than doubles the angle of vision through which you can make thermometer readings. And does it without sacrificing high magnification. It increases the visibility of thermometers from two to five times. It gives you BINOCULAR VISION for the first time. No squinting or closing one eye to make readings.

Add one other feature: "BINOC" Tubing eliminates bore reflection, which has been so tricky and has led to inaccurate readings in the past. It gives a clear, definite contrast between the empty and the mercury-filled portions of the tube.

Make sure that you see all these advantages. Then you will realize what they will mean in your plant. A Taylor representative will gladly help you make a test of "BINOC" Tubing in your office so that you can compare the old type lens tubing with the "BINOC" Triple Lens Tubing. If you are interested in doing this immediately, write direct to Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.



Called "the greatest advance in glass thermometry" —Taylor "BINOC" Tubing in New Taylor Industrial Thermometer (above). One glance at the broad, sharply defined mercury column is enough to make you say, "Here is the easiest-to-read thermometer I ever saw."

Taylor

INDUSTRIAL THERMOMETERS

with **"BINOC"** *tubing*

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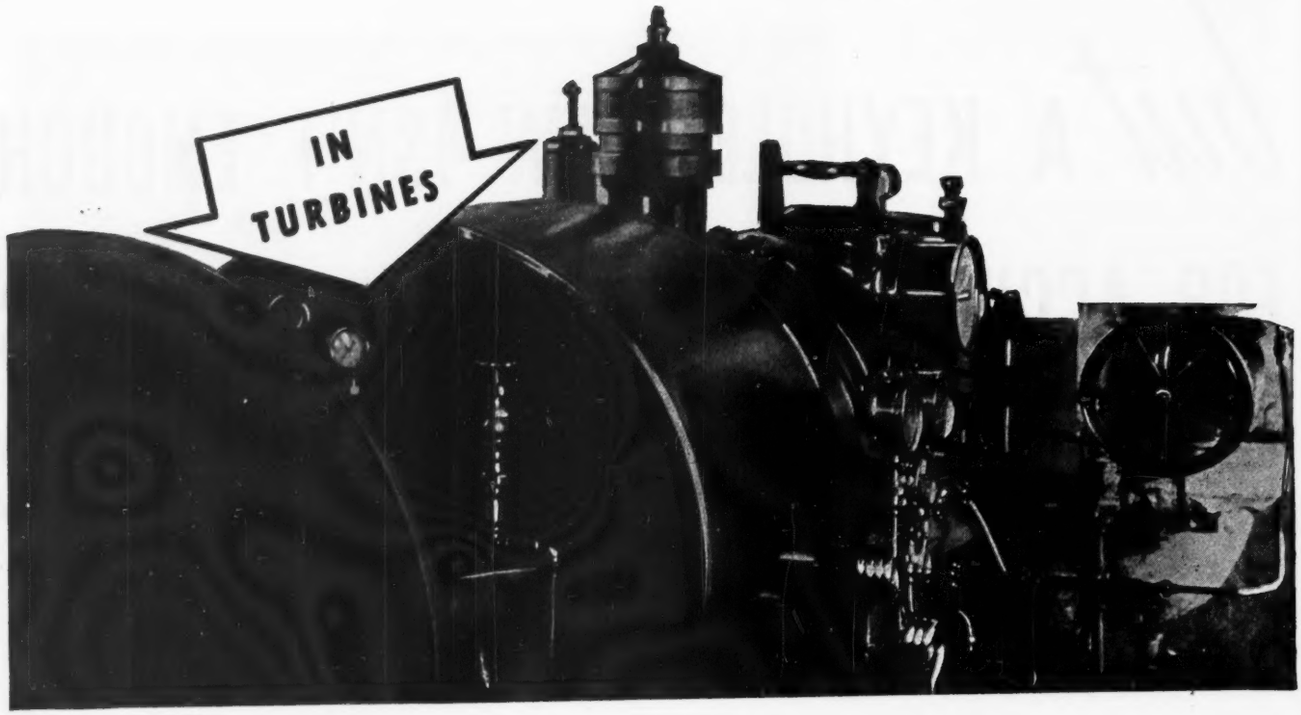
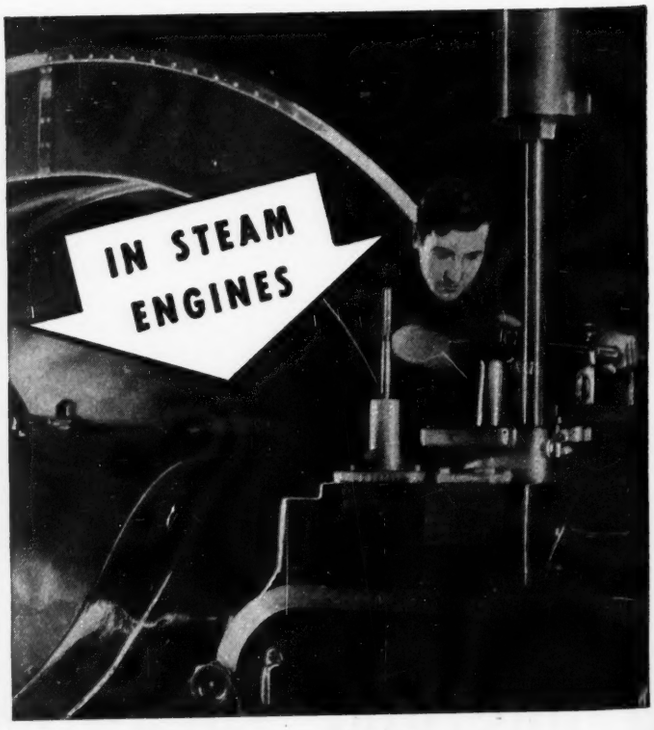
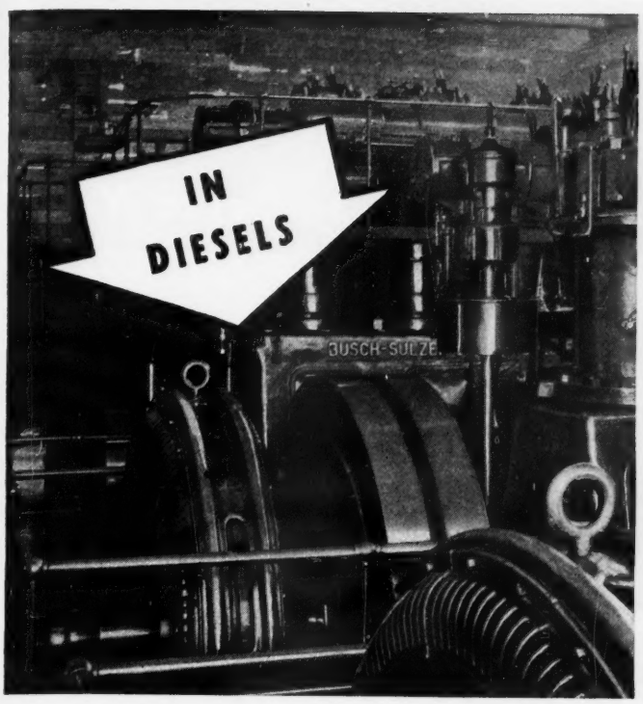


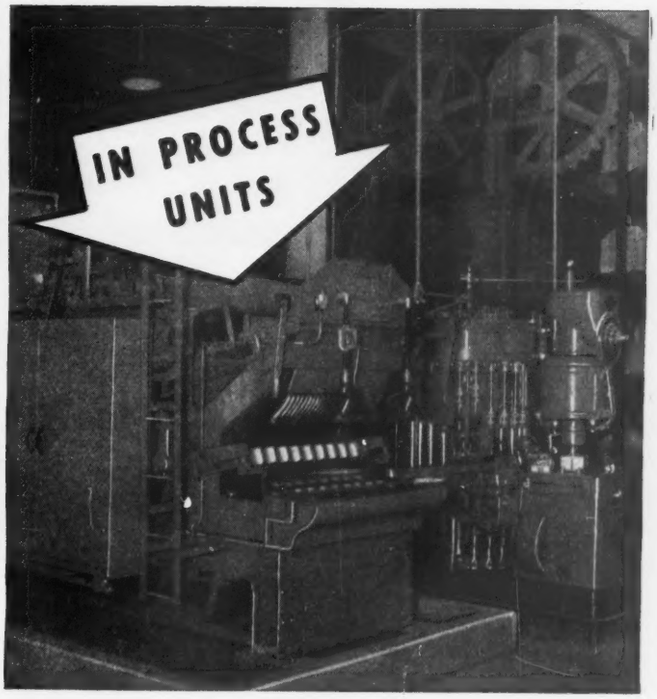
With TEXACO



TEXACO
REG. T. M.

TEXACO





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FROM your power units down through the plant, Texaco at work will help you keep production up, maintenance costs down.

For your reciprocating engines, there is a particular Texaco Steam Cylinder Oil for every operating condition. These are highly effective in reducing wear.

In your turbines, Texaco Regal Oils retain their extreme purity, resist oxidation and sludging, reduce oil losses, give extra years of service life.

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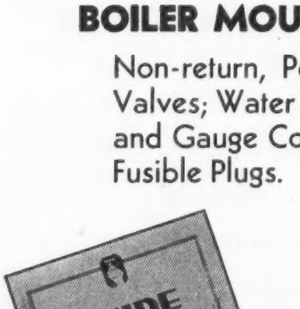
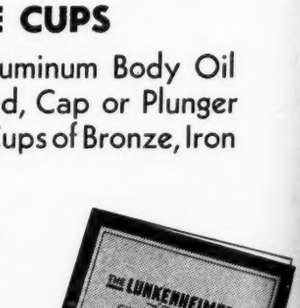


The Guide is a ready reference for selecting Valves, Boiler Mountings and Lubricating Devices in which products are grouped by pressure, type and use. The catalog describes and lists the Lunkenheimer line. Ask the distributor for copies or write us direct.



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Freshness!

CONSUMERS are quick to notice the unfailing freshness and superior flavor of mayonnaise and salad dressings — when the products are Vapor-Vacuum* Sealed with tamper-proof WHITECAPS.

PACKERS in increasing numbers recognize Vapor-Vacuum Sealing as a *sales-booster*, as well as the solution to the closure problem. The process preserves full, original flavor by maintaining absolute freshness. The WHITECAPS lend added beauty, dignity, and eye-appeal to modern glass containers.

WHITE CAP COMPANY engineers will be pleased to assist in the solution of your particular closure problem.

* Trade-mark of White Cap Company

VAPOR-VACUUM SEALING

SO EASILY CAPPED

WHITE CAP COMPANY

SO EASILY RESEALED

THIS PROBLEM IS *Nothing New to him*

THE GULF MAN
IN A SUGAR REFINERY—
ACTUAL PHOTOGRAPH

In sugar mills, bakeries, candy factories, canning plants—every type of plant in the food industry—Gulf engineers are working with operating men every day to improve lubrication and make machinery run better.

Gulf Lubrication Engineers Have Had Broad Experience in Plants Similar to Yours . . . .

THIS is where the Gulf engineer feels at home—out in the plant working with the men who make the wheels go 'round.

He has tackled many lubrication problems like this before—it has been his business to cooperate with plant men for years. His aim is to increase the efficiency of lubrication, to effect savings in maintenance and to improve plant production.

Many plant executives have found that this service—extended to all users of Gulf quality lubricants without cost—has helped them make savings far greater than their total bill for lubricants for a year.

A Gulf engineer is always at your service.

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GULF OIL CORPORATION ★ GULF REFINING COMPANY

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

Awarded 5 Stars for Efficiency

★ costs less ★ cuts fuel costs ★ time saving

★ cleanest ★ most sanitary

● Nature awarded Aluminum many Stars of Efficiency. Science improved nature's basic qualities; made Aluminum tough and strong for "Wear-Ever" Trunnion Kettles.

★COSTS LESS . . . Aluminum can't rust; defies depreciation; never needs resurfacing or retinning.

★CUTS FUEL COSTS . . . Aluminum is a speedway for heat; requires minimum fuel for maximum results.

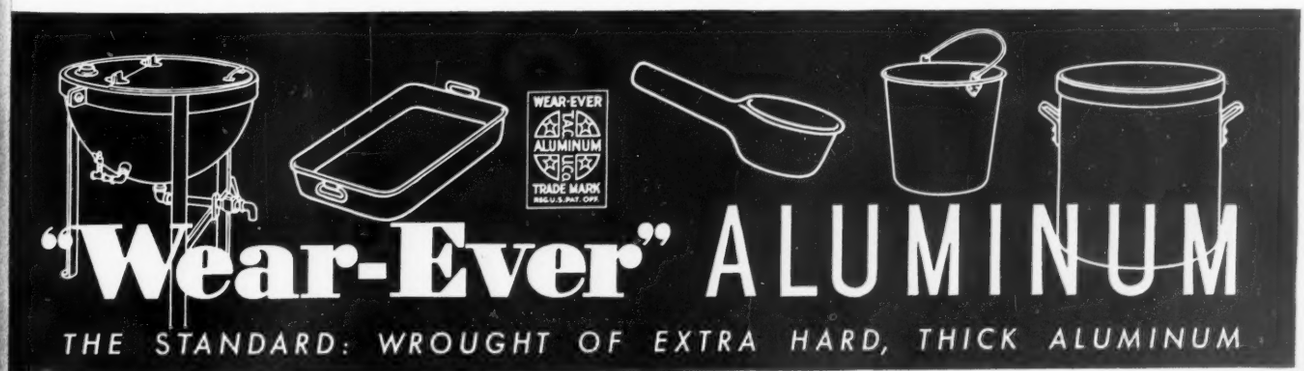
★SAVES TIME . . . The extraordinary heat conductivity of Aluminum assures faster cooking; minimizes the risk of hot spots and scorching.

★CLEANEST . . . "Wear-Ever" Trunnion Kettles are seamless; no rivets or ridges to hold or hide food particles.

★MOST SANITARY . . . "Wear-Ever" Aluminum is absolutely nontoxic, sterile; can't discolor foods nor affect their taste.

Be it the largest Aluminum steam jacket kettle or the smallest dipper, you can rest assured that every "Wear-Ever" utensil is made of the best adapted Alcoa Aluminum Alloy for longest life and enduring satisfaction. Catalog and prices are yours for the asking. Write THE ALUMINUM COOKING UTENSIL COMPANY, Desk L-400, 11th Street, New Kensington, Pennsylvania. (*Offices in All Principal Cities*)

ALUMINUM IS FRIENDLY TO FOOD



"Wear-Ever" ALUMINUM

THE STANDARD: WROUGHT OF EXTRA HARD, THICK ALUMINUM

THIS AD SIMPLY STATES PLAIN FACTS!

It tells how Sovac Oils have reduced repair work 66% and saved up to 15% on "gas"

FACT 1

"CRANKSHAFTS AND CYLINDER BLOCKS HAD TO BE REGROUND EVERY 100,000 MILES," reports Henry J. Albright, owner of large bus fleet in Coxsackie, New York. The Albright fleet is composed of 13 modern buses operated in urban and interurban service. They average 467,000 miles per year.

FACT 2

"CHANGE TO SOVAC OILS EXTENDED REGRINDS TO 300,000 MILES"—66% less repair work on his motors—a big reduction in operating costs. This was not just a temporary saving. It has continued for more than a year. Mr. Albright gives full credit to Sovac Oils for this economy.

FACT 3

"I NOW HAVE CLEANER MOTORS . . . LESS WEAR IN CYLINDER WALLS, RINGS AND BEARINGS." Mr. Albright gives this further proof that Sovac is the greatest commercial fleet motor oil ever made. It will pay you to know what this oil is doing for fleet owners throughout America. Read the statements below.

CAN *you* duplicate Mr. Albright's experience? It's entirely possible. Hundreds of fleet owners have.

Here's the reason: Sovac Oils are made by Socony-Vacuum's Clearosol Process.

None of the material left in these oils is unstable at the normal piston and cylinder wall temperature encountered in service—no carbon is released.

Furthermore, Sovac Oils have a resistance to thinning and oxidation formerly found only in the finest of automobile motor oils.

That's why maintenance costs tumble . . . oil consumption is cut . . . even gasoline savings as high as 15% are made when operators change to Sovac Oils.

Ask the Socony-Vacuum Fleet Engineer to show you "PROOF—THE SOVAC ECONOMY STORY." It's full of money-saving facts that help cut costs.

A change to Sovac Oils made these buses earn more money.

SOCONY-VACUUM OIL CO., INC.

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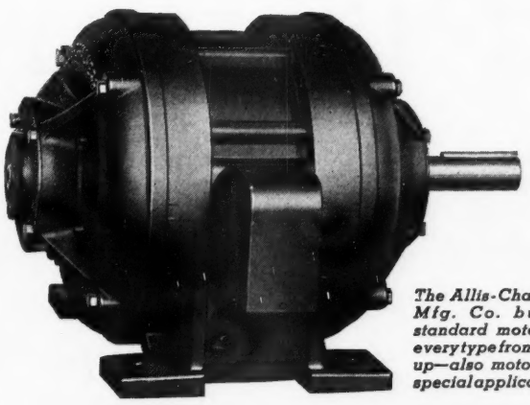
SOCONY-VACUUM

THE *Proprietor*

EATS IN ANOTHER RESTAURANT

IT'S an old quip . . . about the restaurant proprietor who steps out for his lunch. But its implication is deadly—he doesn't eat his own food.

We manufacture motors. We also manufacture the most diversified line of machinery of any company on the American continent, and that machinery is driven by the motors that we build . . . by Allis-Chalmers motors.



The Allis-Chalmers Mfg. Co. builds standard motors of every type from 1 hp. up—also motors for special applications

All the engineering skill and ability that have gone into the development of that vast and distinguished line of mechanical and electrical machinery have contributed to the development of Allis-Chalmers Motors; for our policy is one of undivided responsibility and the highly specialized knowledge and experience of every department is exchanged with that of every other department where it may have any bearing. It is from this wide and varied background that we designed and developed Allis-Chalmers Motors specifically for industrial application.

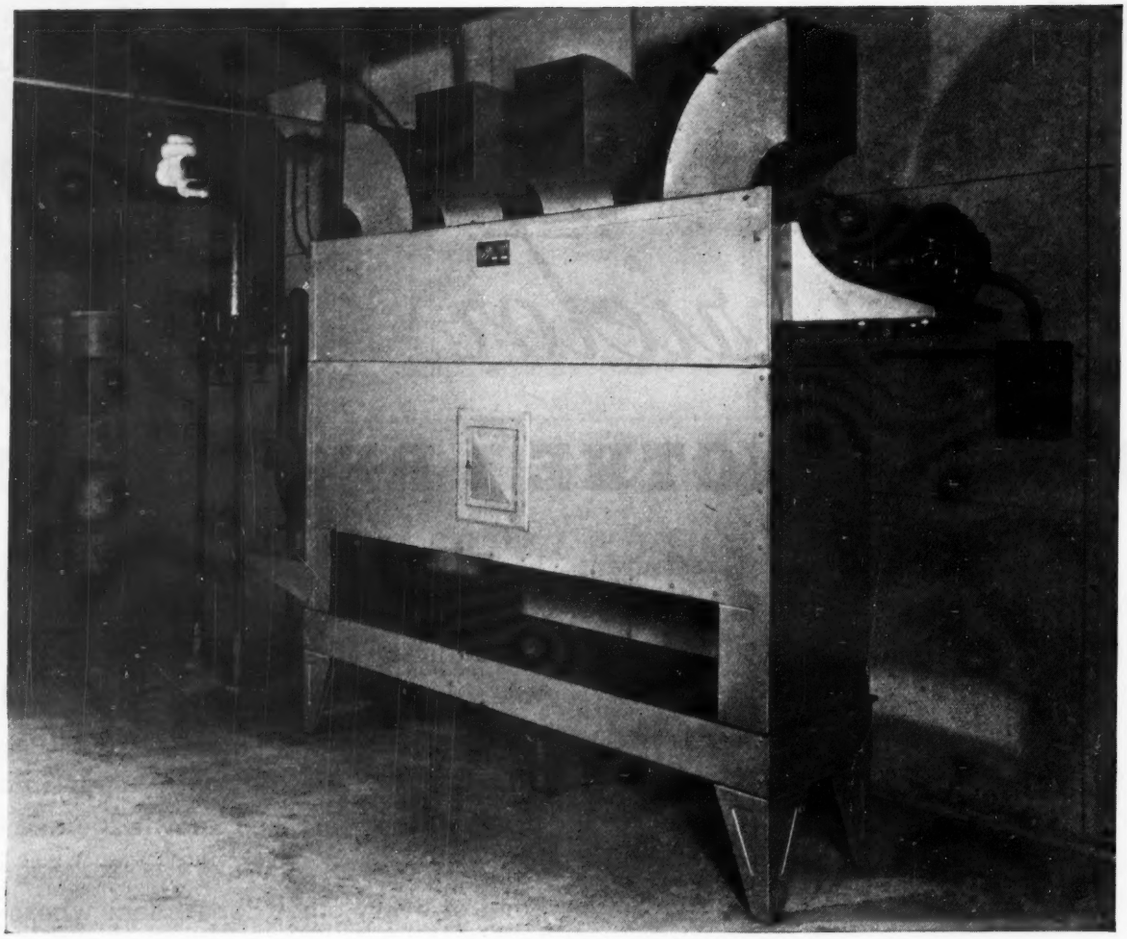
Allis-Chalmers Motors excel because they are the sturdiest motors on the market today—bar none. And they are the most profitable motor buy on the market today—bar none, because their great mechanical and electrical strength reduces maintenance costs to the minimum and extends their life beyond that of all less sturdily constructed motors.

MOTOR DIVISION

ALLIS•CHALMERS

FOR EVERY PURPOSE

MILWAUKEE WISCONSIN



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Ask for Bulletin 2968 for details

BIGGER economies in the cold rooms where automatically-operated Buffalo Unit Coolers are on the job — BETTER products due to uniform, evenly-distributed cold air!

That's why hundreds of plants are turning to Buffalo Unit Coolers. With our complete line — for all refrigerants — sold thru branch engineering offices where cooling problems are thoroly understood, we can be of help to *you*.

May we show you how?

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QUALITY

Right Down the Line . . .

FROM TIN PLATE TO FINISHED PRODUCT

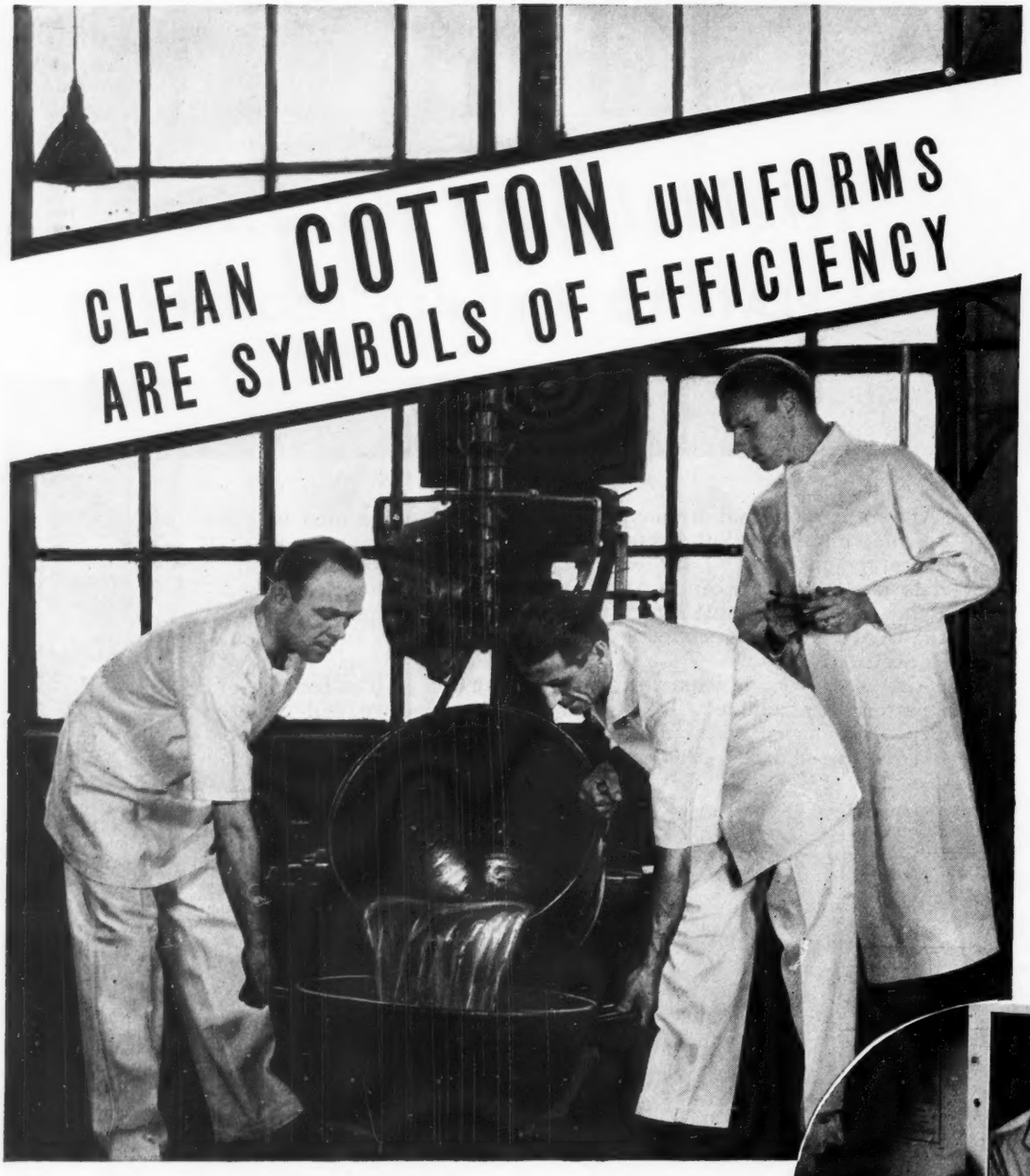
QUALITY in a finished product depends upon the skill of the manufacturer and the kind of raw materials he uses. We are equipped to provide the can manufacturer with the right kind of tin plate to suit his needs.

Our tin plate is made from the finest materials available. It is carefully and efficiently handled from ore to the finished product by the most capable men in the industry, and must pass rigid inspections for surface texture, gauge and uniformity before it is permitted to leave our plants.

The strategic location of our plants makes it possible for us to give our customers the benefits of our complete service and we are equipped to handle tin plate orders to meet any specification.

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



Because it's good business the employees of many of America's most successful concerns are as neat and clean—as spick and span—as the good things they produce or the attractively packaged articles they sell.

Not only manufacturers but independent retailers and chain stores know that clean, neat uniforms are a definite contribution to employee efficiency. Linen Supply services are now available in over seven hundred cities of the United States.

Wellington Sears Company supplies cotton fabrics for hygienic uniforms and towels—the Linen Supply industry provides facilities for laundering and delivering immaculate, sterilized uniforms and towels on a rental basis. These services by the Linen Supply industry assure the most satisfactory and economical method of providing your employees with clean garments and towels. Take advantage of them in your own business—your local Linen Supply company can tell you all about it.

COTTON TOWELS—
NOT ONLY BETTER BUT COST LESS!

For quick thorough, sanitary and economical* drying, there is no substitute for cotton towels. Fairfax towels and toweling, such as the continuous cabinet crash shown here are standard for industrial use, just as Martex bath towels are standard in the finest homes and hotels.

* Recent testimony before a government department at Washington, D. C., by a representative of a nation-wide research organization, showed the average person uses 2.45 paper towels for each drying.

WELLINGTON SEARS CO.

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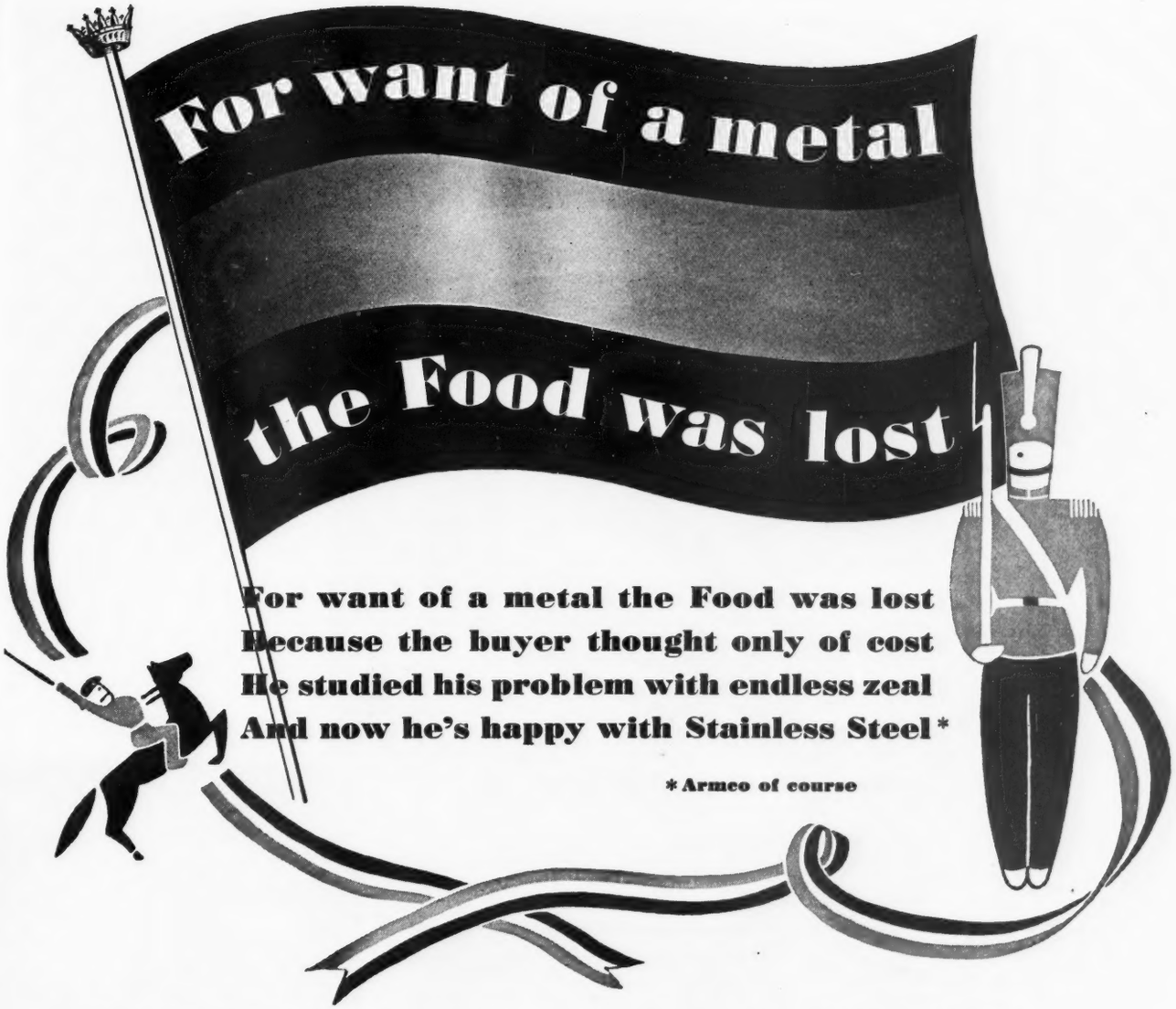
NEW YORK CITY

BOSTON PHILADELPHIA ATLANTA DETROIT CHICAGO ST. LOUIS NEW ORLEANS SAN FRANCISCO


For want of a metal
the Food was lost
For want of a metal the Food was lost
Because the buyer thought only of cost
He studied his problem with endless zeal
And now he's happy with Stainless Steel*
*Armco of course

TONS of food in the industry have gone the way of the king's horse—food that might have been saved had ARMCO Stainless Steel been used.

The food industries no longer consider ARMCO Stainless expensive. You can hardly call a metal expensive that outlasts the useful life of the equipment . . . that helps preserve flavor and keeps down spoilage . . . that is so easy to clean and keep clean and prevents harmful bacteria from gaining the upper hand.

Still another cost that ARMCO Stainless cuts out is replating and refinishing. From flawless top surface to bottom side, ARMCO Stainless Steel is the same rust-proof, corrosion-resisting metal all the way through. Food acids have absolutely no effect upon its smooth, gleaming surface.

You can specify ARMCO Stainless for the equipment and machinery you buy, or you can order it from the nearby Armco Distributor in the form of sheets, strip and plates. It is available in an analysis and finish adapted to your requirement; and your maintenance department can do anything with it they can do with ordinary metals that were formerly used.

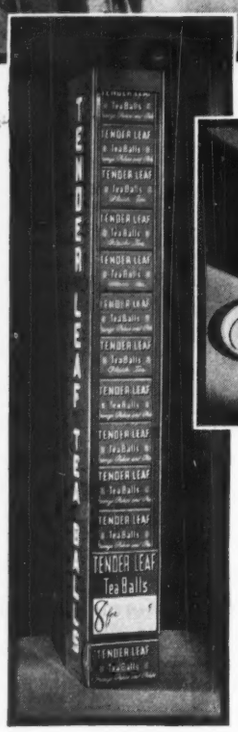
Just write or wire us at this address: The American Rolling Mill Company, Executive Offices, Middletown, Ohio.

ARMCO

ARMCO STAINLESS STEELS

Package Ideas *that Sell* (AND CAN FOR YOU)

BEEN DOING WITHOUT a pouring spout for edible oils and syrups?... too expensive?... hard to stack?... costly to fill? This brand new spout answers every objection. It's inexpensive. It attaches after the cans are filled and sealed. And cans stack—because this spout lies below the rim. Available for pints, quarts, gallons. Like to see it?... price it?



PERHAPS THE MOST SUCCESSFUL display-dispenser ever developed is this wall-rack, made by Canco's Merchandising Specialties Division. Wherever it goes—and there are well over a million of this type at work in different fields—it *sells.* Advantage: It stocks and displays small packages—at the same time it rotates the stock, insuring fresh merchandise at all times. Helps the dealer, sells the consumer. Inexpensive, too. Especially valuable in the food field. We'll be glad to demonstrate one ...or design and build a different type of display that meets your particular merchandising needs.

WHEN ONE BUY STARTS ANOTHER. Find an extra reason for making your product wanted, and you find your sales moving up, up, up. That's the experience of *this* manufacturer who adopted this idea of second-use container tops—metal closures that later become coasters (or ash trays) each with a different design to make women repurchase to complete a set. First used for tea, it's an idea that is practical (and profitable) for dozens of products.

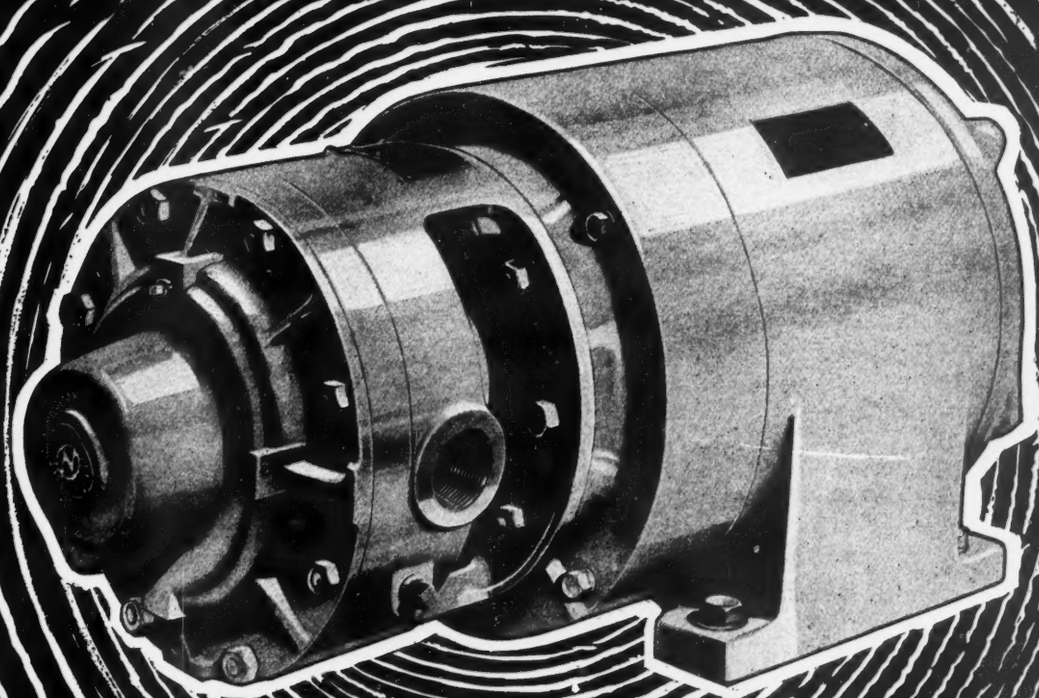
PRODUCERS OF FROZEN VEGETABLES needed an institutional-size container that would be staunch, inexpensive, right for refrigeration. We studied, worked out two: one with fibre body and metal friction-top; the other all metal. Both right, both ringing the bell. Have you a new product, a tough packaging problem? No matter how new or how tough—put it up to Canco.

AMERICAN CAN COMPANY

230 Park Avenue CANCO *New York City*

World's Largest Manufacturer of Metal and Fibre Containers

Centralized Food Plant Economy



CLEAN
COMPRESSED AIR

For agitating, blending, or pressure displacement, and for maintaining pressure on storage tanks. The fine quality of your product can be assured with a Nash Compressor, because only clean air, free from dust, heat, or oil, is delivered. One moving part, no pistons, no internal lubrication. Ask for Bulletin No. 236.

THE NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

A TRUST ONLY GLASS CAN FULFILL

MILLIONS of mothers buy millions of cans of prepared baby foods each week—to give their babies the best of foods, and to save themselves much needless work.

Based on trust and backed by medical opinion, this industry has a tremendous obligation to provide only the best and purest of products. That's why such leaders as Gerber, Clapp, Nestles, Merrell-Soule, Mead-Johnson, use so much Pfaudler Glass-Lined Steel Equipment. The smooth, shining surface of glass-lined steel is so easy to keep spotlessly clean and sanitary. The glass protects the contents from contamination. Vitamin content is maintained. Truly the foods prepared in Pfaudler Glass are fit for a king—and twice as carefully prepared.

What Pfaudler is doing for prepared baby foods is being duplicated for makers of tomato products, soups, jams, preserves, extracts, mayonnaise, milk products, beverages, and many other products. Catalog No. 759 tells how and why. THE PFAUDLER Co., 1510 Gas & Electric Bldg., Rochester, N. Y. Factories: Rochester, N. Y.; Elyria, O. Branches: New York, Chicago, Philadelphia, Elyria, O., San Francisco and Los Angeles (Pfaudler Sales Co.).

PFAUDLER *glass-lined steel* EQUIPMENT

MULTIMIXERS • TOMATO PRODUCTS COOKERS • PERCOLATORS • MAYONNAISE MIXERS • VACUUM PANS • SOUP KETTLES • BEAN SOAKERS

Re-designed and Modernized Valves

Powell standard bronze and iron body gate, globe, angle, check, and Y valves have been re-designed to better withstand existing service demands. Fundamentally correct in design, they appeal to the plant engineers who want dependable performance. These re-designed and modernized valves are listed in the Powell new No. 11 catalog.

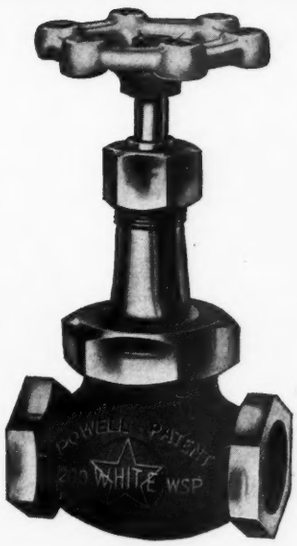


FIG. 102
BRONZE WHITE STAR GLOBE VALVE

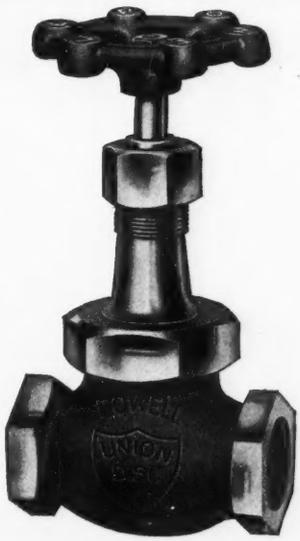


FIG. 150
BRONZE COMPOSITION DISC
GLOBE VALVE

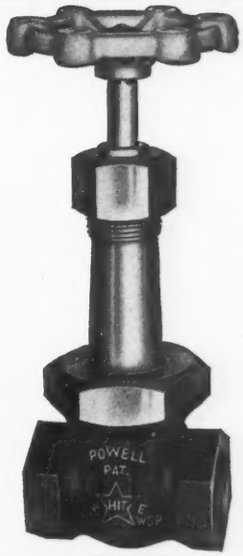


FIG. 375
BRONZE WHITE STAR GATE VALVE

FIG. 1444
IRON BODY RISING
STEM GATE VALVE

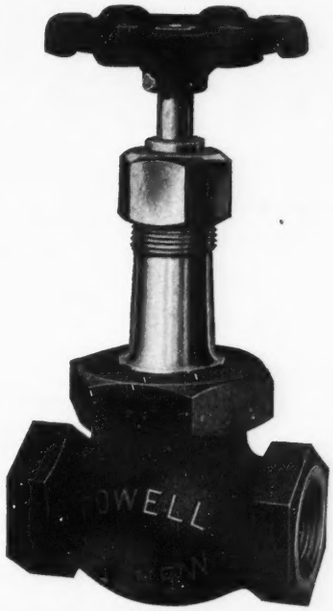


FIG. 190
IRON BODY IRENEW GLOBE VALVE

FIG. 1431
IRON BODY NON-RISING
STEM GATE VALVE

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

FORD INTRODUCES FOR 1937

2 V·8 ENGINE SIZES

85 HORSEPOWER FOR HIGH SPEEDS OR HEAVY DUTY

60 HORSEPOWER FOR LIGHT DELIVERY SERVICE

CHOICE OF POWER TO FIT YOUR NEEDS

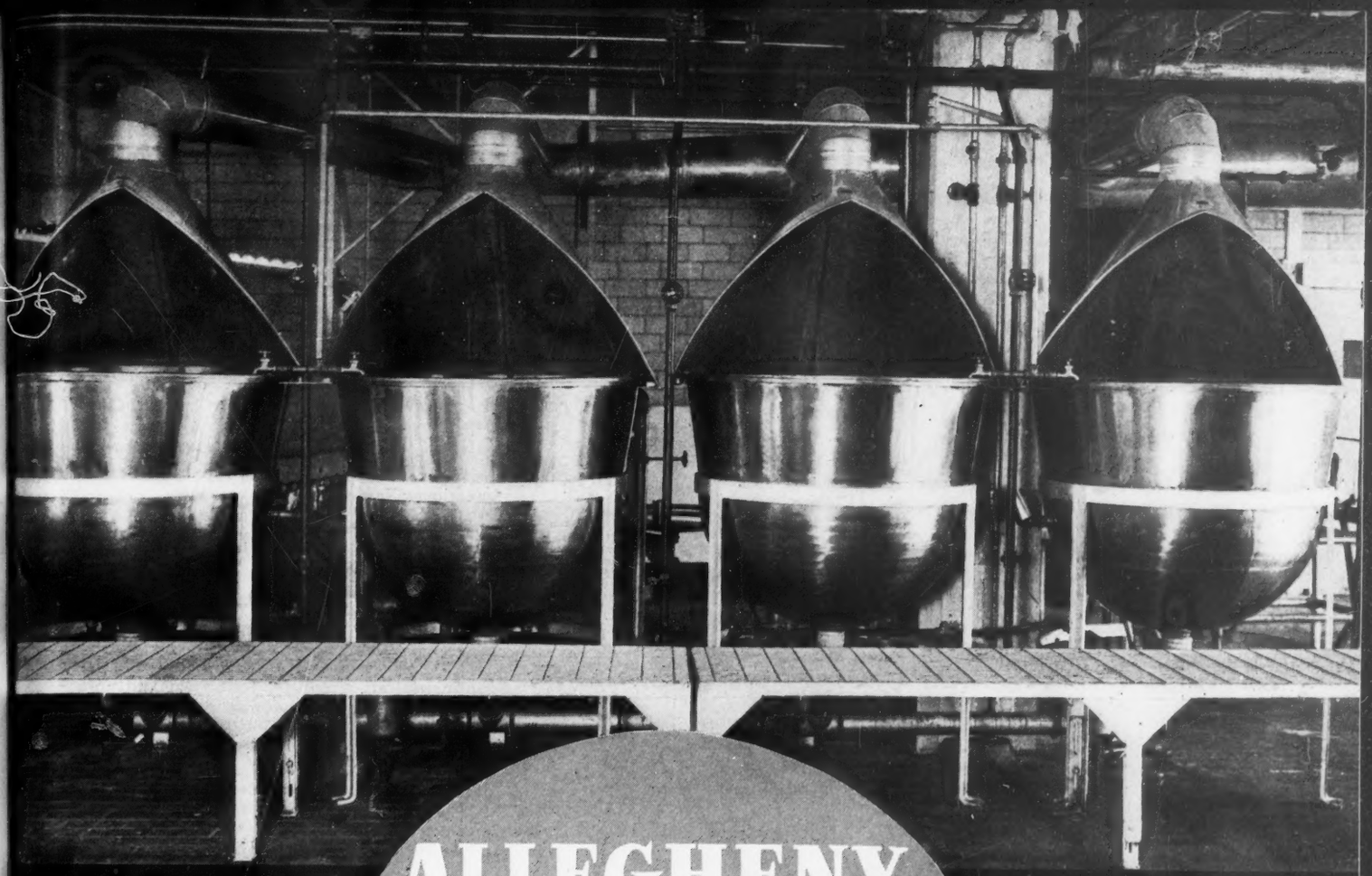
With these two great V-8 engines, Ford offers a full line of optional equipment to apply power with greatest economy and to meet individual load requirements. These options make many combinations available, one of which will do your hauling or delivery job at the lowest cost. No compromise truck can give you such economy.

In addition, Ford introduces the most advanced style in truck design . . . and many other features that assure greater economy and longer life. Get the facts about this new Specialized Transportation from your Ford Dealer. Call him today and set a date for an "On-the-Job" Test.

Convenient, economical terms through the Authorized Ford Finance Plans of the Universal Credit Company

1937 FORD V·8 TRUCKS

Matching the HIGHEST in Quality...Selling with the LOWEST in Price



E TIME-TESTED

STAINLESS STEEL

ALLEGHENY METAL

Food Processing Kettles in the

CINCINNATI PLANT OF THE KROGER GROCERY *and* BAKING CO.

Savory food preparations, made to the highest standard of quality, are securely safeguarded in these Food Processing Kettles of Allegheny Metal.

Stronger and more durable than ordinary steel . . . sanitary as glass . . . beautiful as polished silver . . . resistant to the combined corrosive action of heat, water, steam and food acids for all time—Allegheny Metal has become the logical choice of user and fabricator alike . . . specified by foresighted food processors . . . recommended by skillful fabricators everywhere. Ask your equipment manufacturer about Allegheny Metal.

ALLEGHENY STEEL CO. . . Brackenridge, Pa.

Sales Offices and Warehouse Stocks in the Principal Cities

Warehouse Stocks carried by JOS. T. RYERSON & SON, INC., WAREHOUSES . . . Union Hardware & Metal Co., Los Angeles . . . American Brass & Copper Co., San Francisco—Oakland

ALLEGHENY PRODUCTS: SHEETS FOR AUTOMOBILE BODIES, METALLIC FURNITURE, DEEP DRAWING; ALLEGHENY METAL, ALLEGHENY STAINLESS STEELS, ELECTRICAL SHEETS, STEEL CASTINGS, SEAMLESS TUBING, BOILER TUBES, PIPE.

(Allegheny Metal is licensed under Chemical Foundation Patents Nos. 1,316,817 & 1,339,378)

Controls Allegheny METAL CONTROLS CORROSION *Corrosion*

HOW DO SMART FOOD MEN GET RICHER FLAVORS WITHOUT AFFECTING UNIFORMITY?
THEY USE A MILD, FLAKED SALT THAT'S ALWAYS PURE AND UNIFORM— DIAMOND CRYSTAL

ONE of the most important qualities of Diamond Crystal Salt, successful food men everywhere tell us, is its unequalled mildness. They find it allows far greater incorporation than ordinary salt, with no danger of developing over-saltiness. You can use more.

That's how they get better flavor and still maintain uniformity in their finished products. They know it's the exclusive Alberger Process of making Diamond Crystal Salt that insures this mildness and keeps it pure and uniform always. Have you tried Diamond Crystal in your plant? Why not order this superior salt today? Diamond Crystal Salt Co., (Inc.), St. Clair, Michigan.

Diamond Crystal Salt

UNIFORM IN COLOR . . . PURITY . . . DRYNESS . . . SOLUBILITY
SCREEN ANALYSIS . . . CHEMICAL ANALYSIS . . . CHARACTER OF FLAKE

*PRESCRIPTION:

For drawing fresh air into any building from outdoors—
A BENDIX P V P FAN, *as recommended.*

For expelling stale air from any building—
A BENDIX P V P FAN, *as recommended.*

For transferring warm air from one part of any building to another, or from building to building—
A BENDIX P V P FAN, *as recommended.*

For removing fumes—even corrosive vapors generated by chemical manufacturing processes—
A BENDIX P V P FAN, *as recommended.*

For assisting the circulation action of air-conditioning equipment—
A BENDIX P V P FAN, *as recommended.*

For body cooling of workers exposed to industrial furnace heat—
A BENDIX P V P FAN, *as recommended.*

For any industrial air-moving function demanding a capacity within their big range: 16-inch two-blade to 36-inch four-blade—wall, ceiling or portable floor style—
A BENDIX P V P FAN, *as recommended.*

Write for literature.

BENDIX PRODUCTS CORPORATION
(Subsidiary of Bendix Aviation Corporation)
403 Bendix Drive South Bend, Indiana

BENDIX FANS

For Industrial Ventilation

*Sold "on prescription," fitting the fan to the function.

TWO WORDS

TARTARIC ACID
POWDERED CRYSTAL GRANULAR

CITRIC ACID
POWDERED CRYSTAL GRANULAR

SODIUM CITRATE

PFIZER QUALITY

THAT SPEAK VOLUMES!

CHAS. PFIZER & CO., INC
Manufacturing Chemists EST. 1849
81 MAIDEN LANE, NEW YORK
444 W. GRAND AVE., CHICAGO

● Rust is a killer of "quality" in shipping cases and inside cartons. Acme Silverstitch has a heavily galvanized finish that helps to give protection against blemishing effects of corrosion.

That's only one advantage of this popular stitching wire. Acme Silverstitch helps cut production time and costs because it is unvaryingly perfect in width, temper, thickness. And it's available in big one-piece ten-pound coils that mean less stops.

Perfect temper also means staples that clinch like bulldogs, and stay clinched for the life of the container—whether in corrugated or solid fibre.

Because the "health" of their shipping cases is vitally important, the majority of shippers use Acme Silverstitch.

ACME STEEL COMPANY

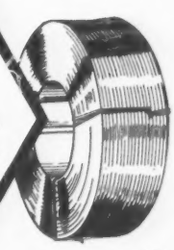
GENERAL OFFICES: 2845 Archer Avenue, Chicago, Illinois

Branches and Sales Offices in Principal Cities

STITCHING WIRE GIVES STRONGEST, SUREST JOINTS IN CORRUGATED AND SOLID FIBRE BOXES

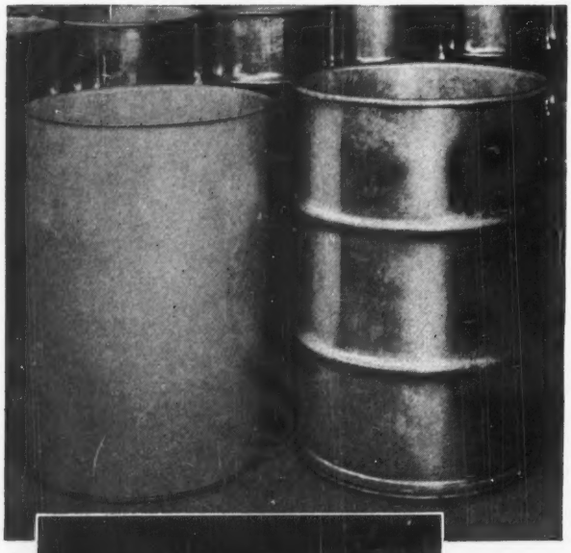
FREE

At our expense, we'll send you a 5-lb. test coil if you'll try it out. Be sure to state size used.



All the advantages of STAINLESS STEEL

... *at low cost*



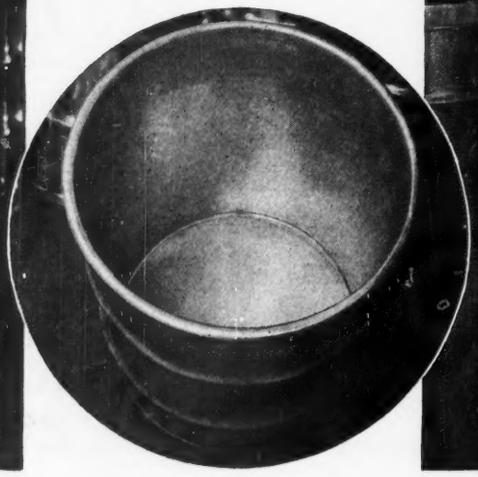
NO other metal is so completely immune to food products as stainless steel. None so permanently bright and clean, so wear-resisting, so enduring.

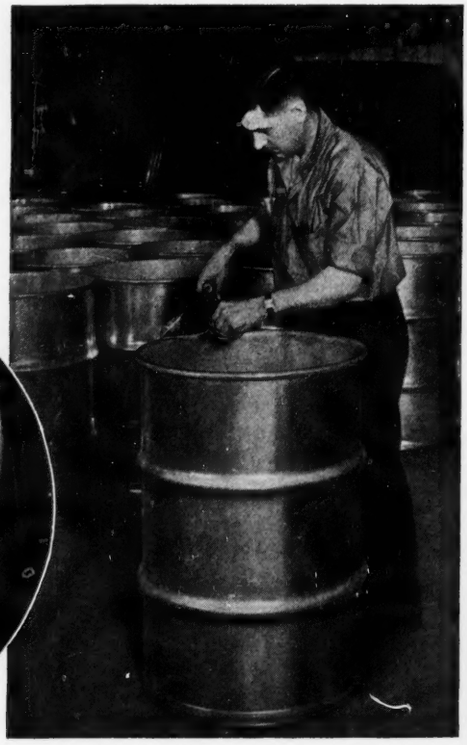
Unquestionably, USS Stainless Steel is the ideal metal for all food plant equipment... and for many applications you can obtain this clean lustrous alloy at a cost much less than you'd expect.

Take, for example, these storage drums lined with USS Stainless Steel. To the acid citrus peel they store, these containers present a continuous inner surface of impervious stainless steel. Yet thanks to this simple ingenious construction, thanks to the ease with which USS Stainless Steel can be fabricated, their cost was moderate. And on the basis of cost-per-day-of-use, they will undoubtedly be the least expensive containers this packer could have bought.

Write us freely about your equipment problems. We will be glad to help you get the advantages of USS Stainless Steel in your equipment at minimum cost... to give you competent advice as to the many ways in which USS Stainless Steel can help you turn out a better, purer product, at less cost.

THESE DRUMS *for storing acid citrus peel—completely lined with USS Stainless Steel—are easy to clean, practically eliminate spoilage, will last indefinitely. They are an excellent example of the many ways in which you can get the advantages of stainless steel at low cost. Write us for other cost-saving, product-improving ideas.*



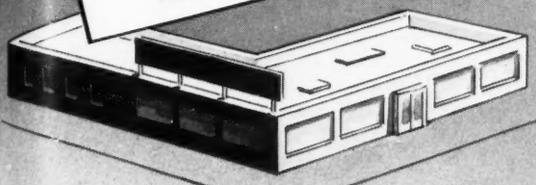


USS STAINLESS STEEL

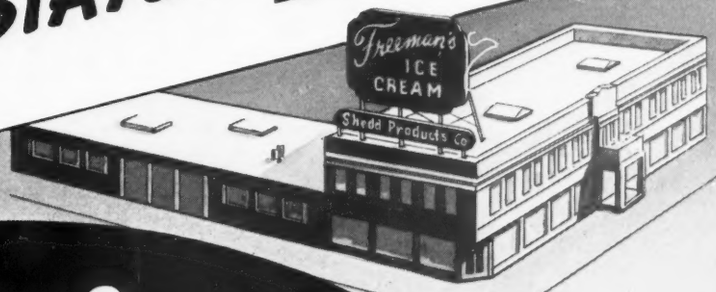
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
AMERICAN STEEL & WIRE COMPANY, *Chicago and New York*
NATIONAL TUBE COMPANY, *Pittsburgh*
Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

THIS PLANT CLOSED BY THE HEAT

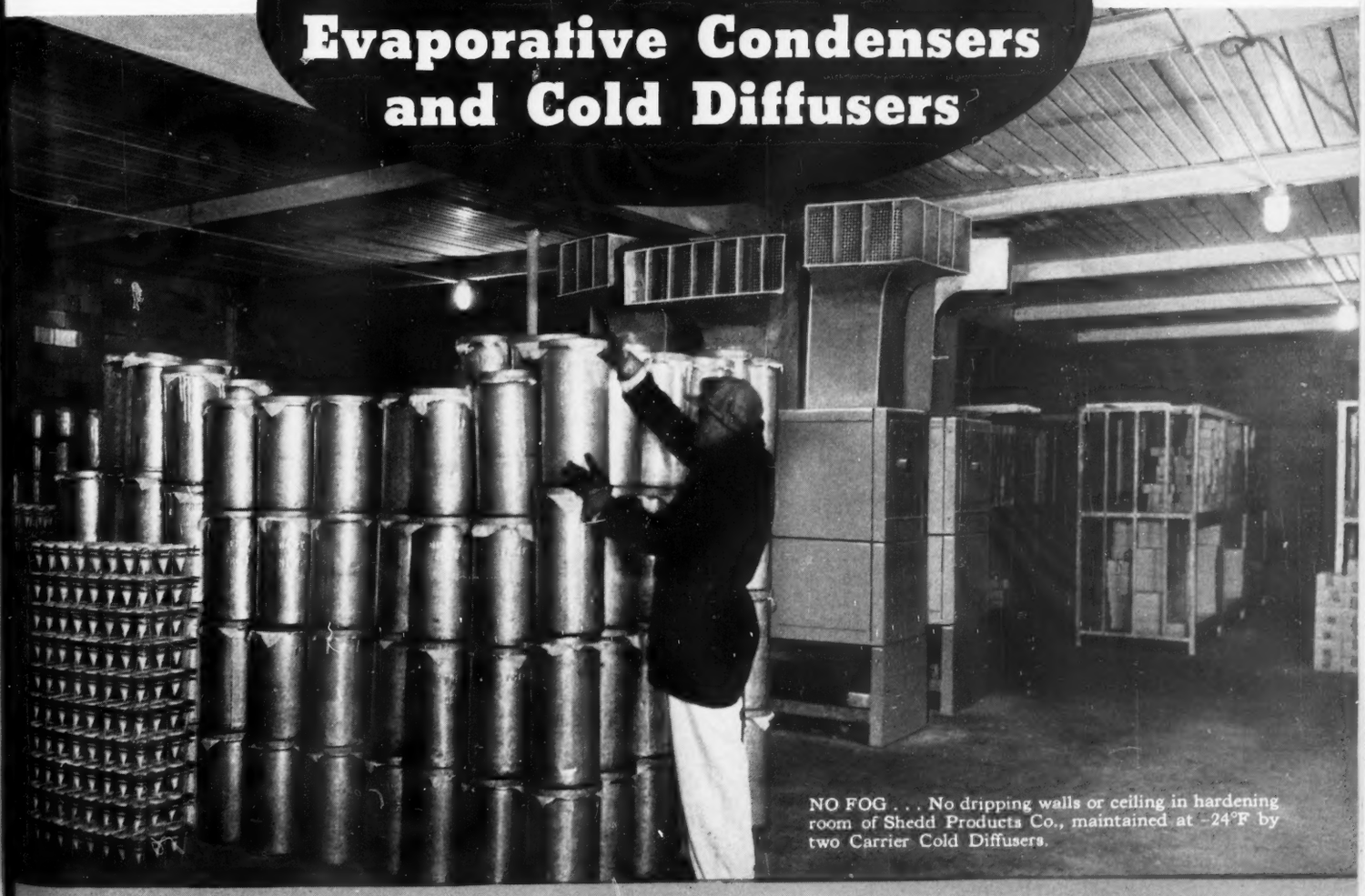


THIS ONE STAYED OPEN



Carrier

Evaporative Condensers and Cold Diffusers

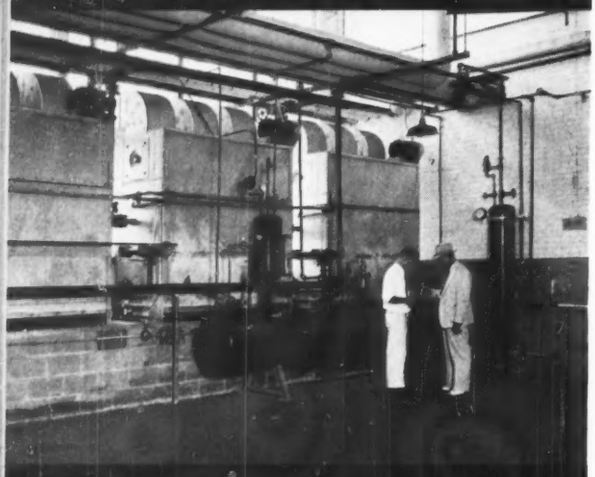


NO FOG . . . No dripping walls or ceiling in hardening room of Shedd Products Co., maintained at -24°F by two Carrier Cold Diffusers.

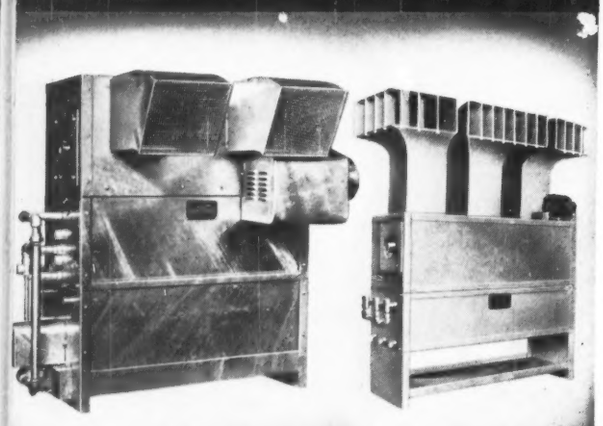
Shedd Products Company Kept Temperatures at MINUS 24° F. Throughout the Hottest Weather....

NOW TURN PAGE

NEW, MODERN plant of Shedd Products Co., Detroit, where Carrier equipment maintained constant refrigeration despite heat wave which forced other plants to close.



FRESH AIR enters these three Carrier Evaporative Condensers through base — is humidified — chilled to -24°F—then sent to hardening room.



CARRIER EVAPORATIVE CONDENSER—of type used in Shedd Products Co.—available in sizes to meet every plant requirement.

CARRIER COLD DIFFUSER—provides constant, circulated supply of chilled, humidified air. No "dead spots." Dripping and fog eliminated.

Carrier Air Conditioning

Evaporative Condensers and Cold Diffusers

reduced water consumption from 1050 gallons per minute to 6

WHEN you reduce water consumption by 99-4/10%—it's a real saving! Yet that's exactly the amount saved by the Shedd Products Co., Detroit, Mich., through using Carrier Evaporative Condensers instead of conventional, old-style methods. And even during the hottest weather—when local plants were forced to close down because of unusual head pressures—these Carrier Evaporative Condensers stayed on the job and kept the freezer at its regular -24°F. without trouble.

But savings in water consumption and a reputation for unusual performance weren't the only features which caused Shedd Products Co., to install Carrier equipment. For one thing, the use of Carrier Evaporative Condensers made it unnecessary to reinforce the ceiling and make elaborate changes in the building construction—changes necessary to use spray-deck types of condensers. There were no costly pumps to buy, no unsightly storage tanks to install. Better, more economical winter operation was assured because, when the outside temperature drops to 35°F, Carrier Evaporative Condensers become *air* condensers—use no water—can't freeze.

Positive Air Circulation Assures Efficient Cooling

By using Carrier Cold Diffusers instead of bunker coils, Shedd Products Co. save space, eliminate dripping walls and ceilings, assure a uniform distribution of cold, moving air. No dead spots! No mould! No fog or mists!

For the attractive new retail "bar," a Carrier Weathermaker utilizes the excess brine from the plant refrigerating system to provide comfortable air conditioning at low cost. (In winter, this same Weathermaker operates from the plant's steam system to maintain temperatures at 70°F.)

The Carrier installation in the Shedd Products Co., is an excellent example of modern product conditioning. But it isn't unusual—Carrier can do exactly the same for you. Give you positive, dependable refrigeration through a gentle circulation of air, properly humidified for your particular product. Prevent dripping and fogging, eliminate dead spots and mould. And save you money—both on installation and operation. The new bulletin "46 Years' Experience" tells you *why*. Mail the coupon today.

CARRIER CORPORATION
850 Frelinghuysen Avenue, Newark, N. J., Desk 606

Send me new bulletin "46 Years' Experience" without obligating me in any way.

NAME .....

ADDRESS .....

CITY ..... STATE .....

Willis H. Carrier in 1911 founded the new industry when he disclosed the scientific laws of Air Conditioning to the American Society of Mechanical Engineers and began making air conditioning installations.

Depend on this TRAILMOBILE PROP to Support the Heaviest Loads Without Breaking or Buckling

Load proportioned frames—axle designs for overloads—springs for rough roads—manual or automatic operation . . . all are illustrated and described in this valuable book. If you operate trailers we will be pleased to send you a copy—FREE.

So expertly has this entire prop assembly been designed and so sturdily is it made that the entire industry has come to look on it as the last word in a dependable trailer support.

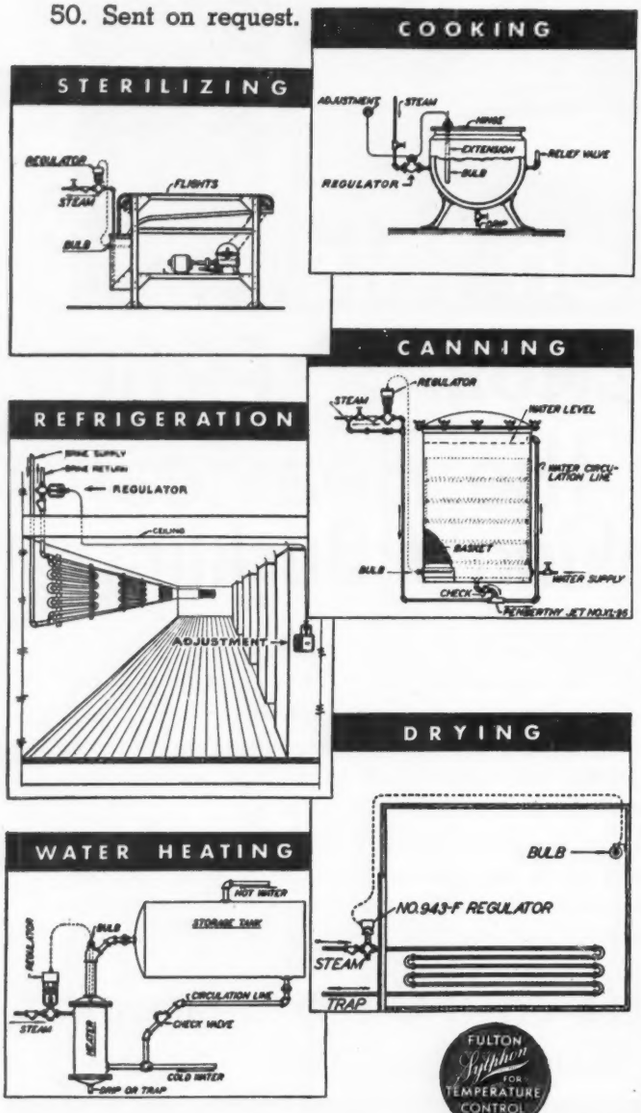
At any angle, it supports the heaviest loads without shifting or bending and gives that security to loads that avoids nose diving or frequent trips to the shop for repairs.

This is only one of the many superior features of Trailmobile Trailers. You owe it to the greater economy of your hauling operations to know about them from this practical book of better hauling equipment. Your copy is ready—send for it today.

THE TRAILER COMPANY OF AMERICA
Oakley, Cincinnati, Ohio

PROFIT CURVES CLIMB
when temperatures are
SYLPHON CONTROLLED

Sylphon Automatic Controls . . . highly dependable, self-contained, self-powered instruments . . . are pointing the way to profits in many leading food plants . . . by protecting product quality, eliminating spoilage and waste, reducing cost of labor and supervision and saving fuel. They can do the same for you. Write for bulletins XG-20 and XG-50. Sent on request.

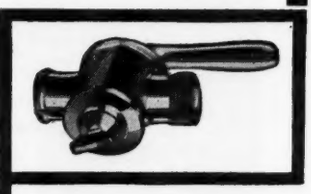


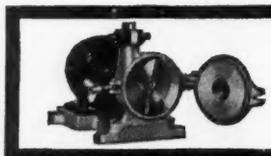
FULTON SYLPHON CO.
KNOXVILLE, TENN., U.S.A.

Representatives in All Principal Cities in U. S. A. and in Montreal, Canada and London, England

MODERNIZE
with TRI-CLOVER
sanitary fittings and pumps

Tri-Clover fittings and pumps are specially engineered and designed for the food industries. Manufactured of Stainless Steel, Bronze Nickel Plated, Trialloy (Nickel Bronze), and stocked for prompt shipment. Installations in America's finest food plants.





- Outboard Timken Bearings.
- One Part to Clean no unsanitary crevices.
- Unequaled performance.

Sanitary fittings. Complete line 1" to 4" in stock in all metals. Designed in accordance with I. A. M. D. standards.

New Tri-Clover pump principle. The screw impeller gently pushes. No agitation or slapping. Smoothest acting food pump on the market. Ideal for fruit juices, tomato juice, corn, peas and many other food products. Your choice of 14 models in Tinned Bronze, Stainless Steel or Trialloy.

Catalogs and price-lists available upon request. Write today

TRI-CLOVER MACHINE CO.

5919 N. 35th Avenue KENOSHA, WISCONSIN

236-M

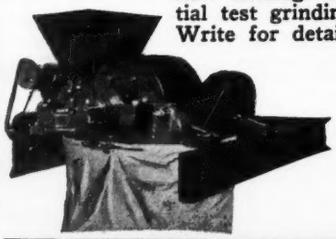
The biggest concerns in the Food Industries
use the

MIKRO-PULVERIZER

REG. U.S. PAT. OFF.

A few of our many users are American Sugar, Borden, Bunte, Carnation, Continental Baking, Hershey, Loose-Wiles, National Biscuit, National Sugar, Nestles, Rockwood, Standard Brands, Swift, United Fruit, Ward Baking, Wilson.

Wet Milling, pulping or dry grinding, the power savings are usually from 25% to 75%. Exceedingly efficient on sugar pulverizing. DUSTLESS! Send for new catalog. Let us make a confidential test grinding on your own material. Write for details today.

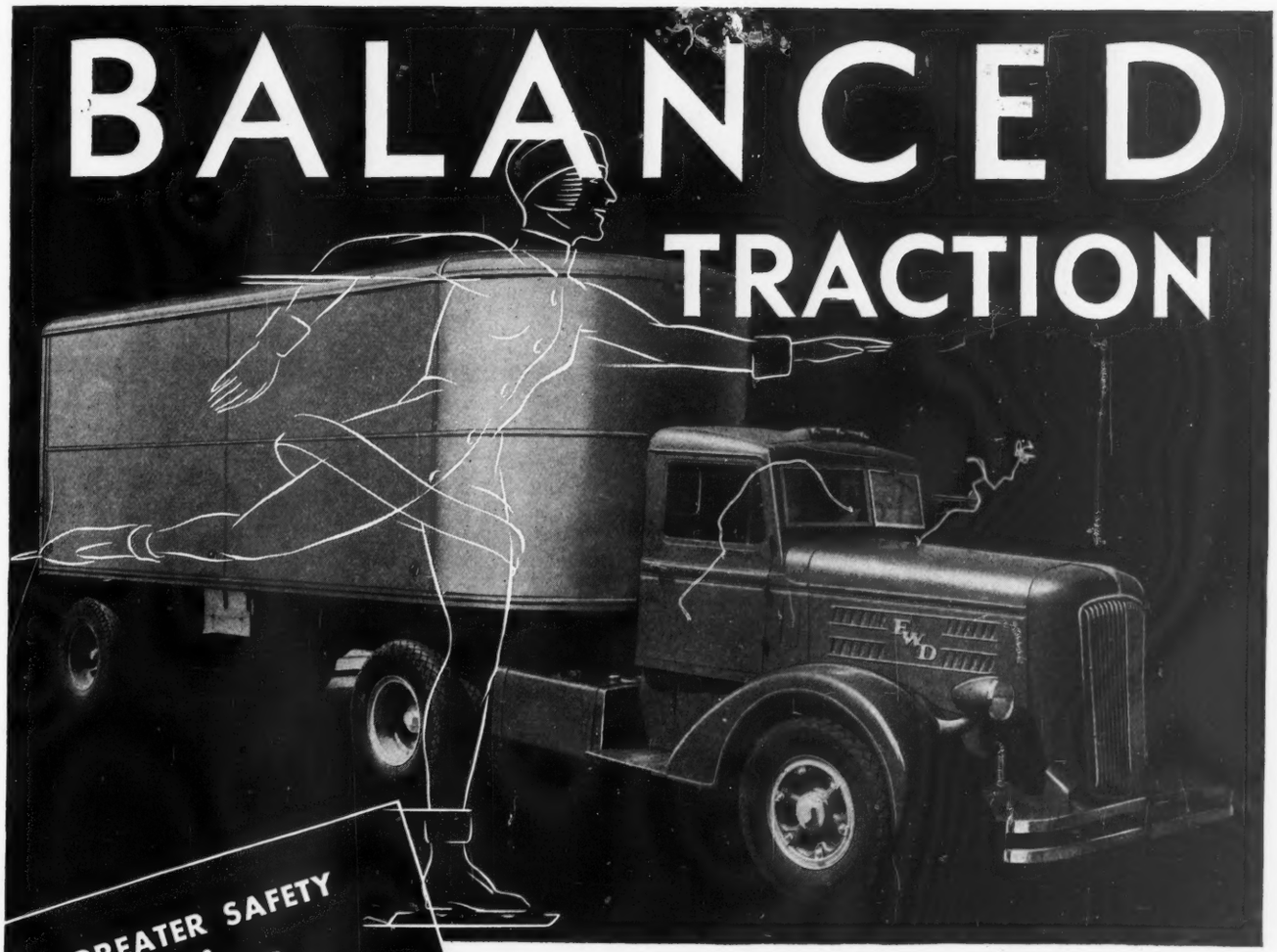


PULVERIZING MACHINERY COMPANY

125 Valley Road
Roselle Park, N. J.

DUSTLESS! NO FANS, CYCLONES or SEPARATORS!

BALANCED TRACTION



GREATER SAFETY
•
GREATER DEPENDABILITY
•
FASTER SERVICE
•
WIDER RANGE OF OPERATION
•
GREATER ECONOMY OF OPERATION

Controlled Power enables the FWD Truck to "Take" roads as they come

In every trucking service where positive traction is essential to negotiate roads under tough conditions — the FWD Truck will perform dependably and economically . . . Its four-wheel-drive principle, that of power and load distribution, gives it positive traction in mud, sand, loose soils, snow and on slippery pavements. In the construction of the FWD, a center differential is used to distribute the power equally to the four driving wheels . . . Its reserve power, rugged construction throughout, and true application of the four-wheel-drive principle, insure continuous operation under any conditions. You'll find speed, safety, dependability, economy, and unmatched performance in the FWD — the pioneer of Four Wheel Drive Trucks.

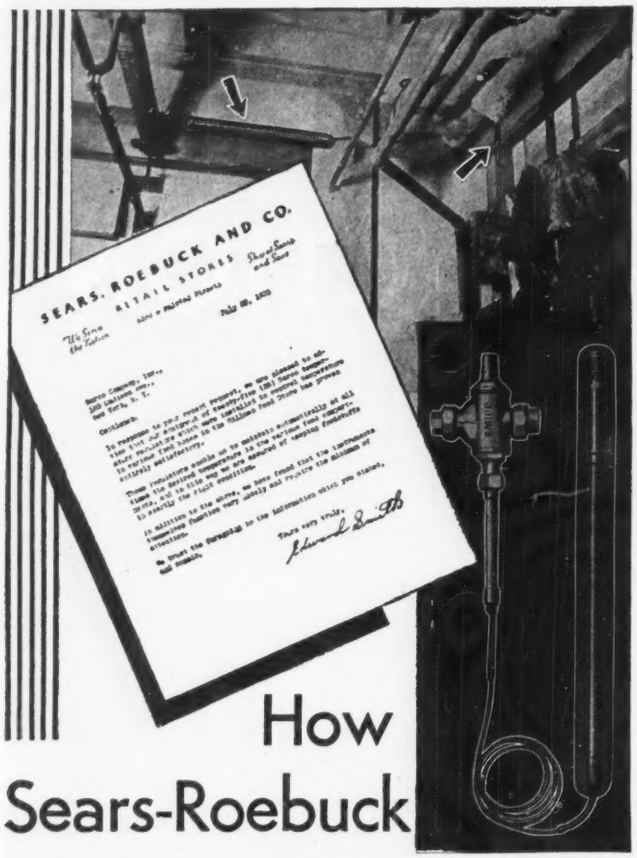
Let us give you the details of FWD Controlled Power.

FWD

FOUR-WHEEL-DRIVE TRUCKS

THE FOUR WHEEL DRIVE AUTO COMPANY
CLINTONVILLE, WISCONSIN
***Canadian Factory*, KITCHENER, ONTARIO**

THE SAFEST TRUCK ON THE HIGHWAY



How Sears-Roebuck Keep Foodstuffs Right

To prevent spoilage of foodstuffs at the Hillman Food Store of Sears-Roebuck & Co., they installed 25 Sarco Temperature Regulators to control the flow of brine through the coils in food storage boxes and display counters.

You will note their letter states, "These Regulators enable us to maintain automatically, at all times, the desired temperature . . . and in this way we are assured of keeping foodstuffs in exactly the right condition . . . they have proven entirely satisfactory."

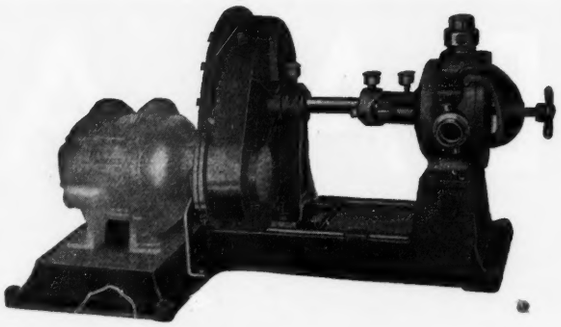
Operated by liquid expansion, Sarco Temperature Regulators have the same power at low temperatures as others develop only on heating service.

When set for any temperature, they automatically maintain it without attention. No compressed air, electricity or water pressure is needed to operate.

Write for information regarding 30-day free trial and Catalog AE-54.

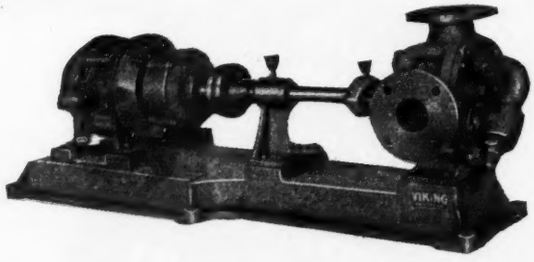
SARCO COMPANY, INC.
183 Madison Ave., New York, N. Y.
Branches in Principal Cities
Sarco Canada Limited, Federal Bldg., Toronto, Ont., Canada

SARCO TEMPERATURE REGULATOR



Sanitary VIKINGS for food liquids

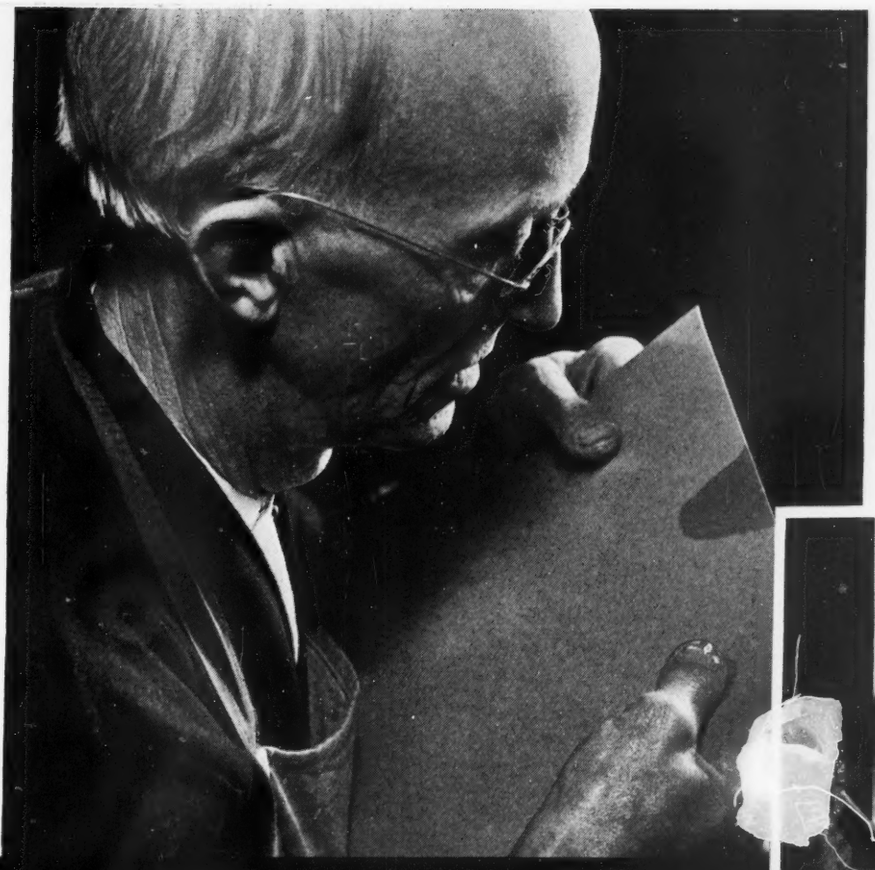
Widely used in breweries, wineries, milk products and food processing plants. Starts without priming . . pumps without churning, pounding or foaming. Unique "take-down" construction makes complete sterilization easy and quick. Approved by all State and National Pure Food Laws. Capacities of 5, to 90 G.P.M. Regular, "Pull-About," "Vertical" and "Straitline" styles. Belt, V-Belt, Direct and Geared Motor Drives. Write for Special Sanitary Pump Bulletin.

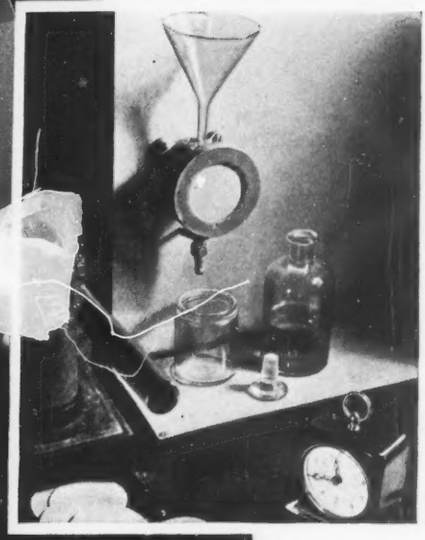


Standard VIKINGS for non-food liquids

For handling all grit-free liquids . . such as water, brine, oils, etc.; the Viking Standard Rotary Pump offers remarkable performance at low original, and operating cost. All sizes, styles and drives. Iron, Bronze-Fitted and All-Bronze constructions. With or without Viking "Relief Valve on Pump Head." Write for FREE Folder and Prices.

Viking Pump Company
Cedar Falls, Iowa





THE "TONGUE-TEST" wasn't true enough

TOUCHING tongue to paper used to determine paperboard's resistance to water absorption. But, for the scientifically accurate measurements demanded by Container Corporation of America, this ancient test was not enough. To get accurate, dependable absorption data, *Concora* paper chemists developed special laboratory tests that permit the setting up—and meeting—of exact standards.

All *Concora* shipping cases and folding cartons have this scientific background—in the making of the paperboard as well as in the constructing and testing of the finished package. Our representative can explain the whole procedure to you—and show you how it will help solve your packaging problems. Better yet, why not visit a *Concora* laboratory?

Clears up the subject of Corrugated Containers

Send This Coupon for Free Booklet That Will Help You in Your Buying.

H-12
Container Corporation of America
111 W. Washington St., Chicago, Ill.

Gentlemen: Please send me a copy of "The Corrugated Shipping Case."

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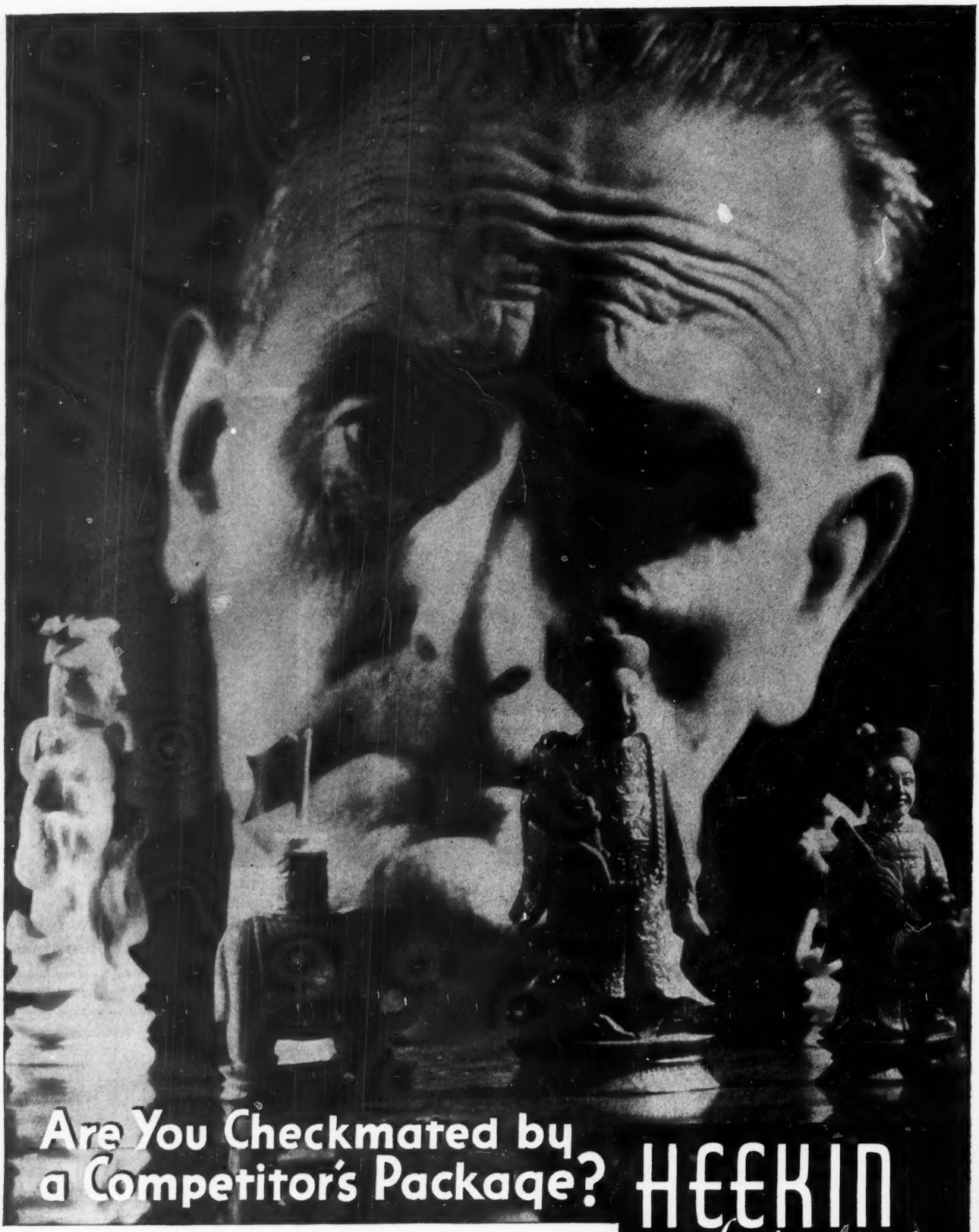
*Address*_____

CONTAINER CORPORATION OF AMERICA

GENERAL OFFICES: 111 WEST WASHINGTON STREET, CHICAGO, ILLINOIS

MILLS, FACTORIES AND SALES OFFICES AT STRATEGIC LOCATIONS



Are You Checkmated by a Competitor's Package?

WAKE up to modern designs in packaging. Don't let competition checkmate you with consumer acceptance. Dress up — spruce up — look up with new color appeal. Let Heekin experts study your packaging problems. Heekin is famous for colors on metal.
THE HEEKIN CAN COMPANY, CINCINNATI, OHIO

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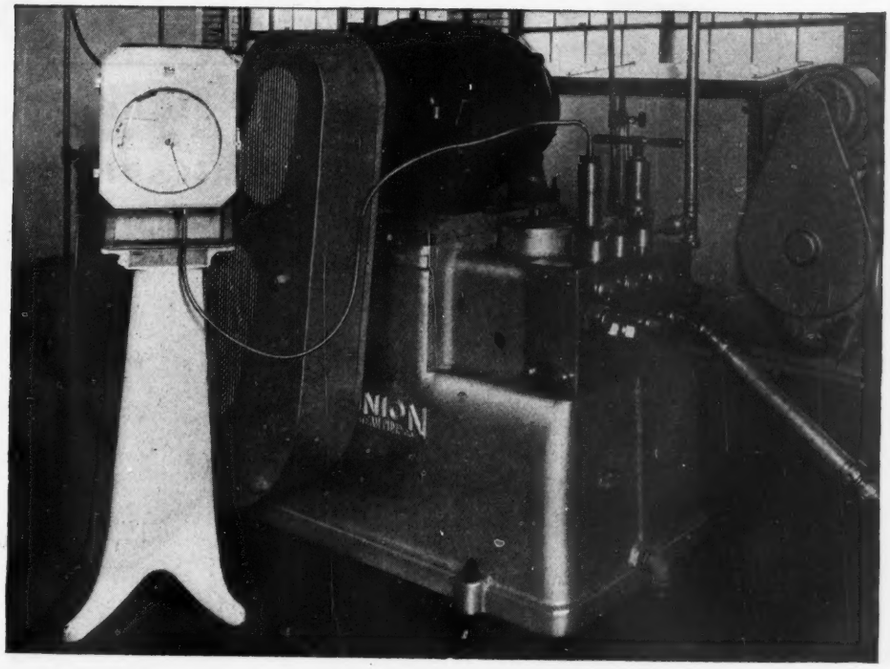
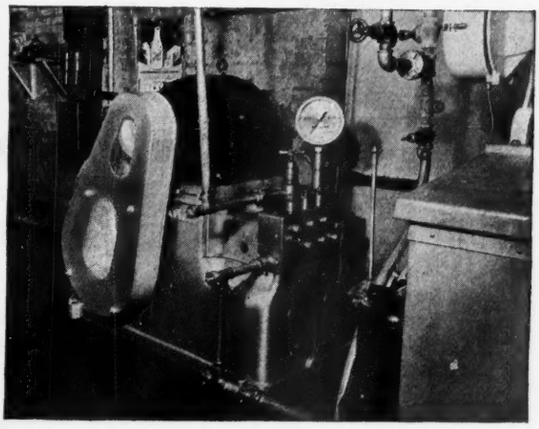
CANS
WITH HARMONIZED COLORS



No. 1036 CHERRY-BURRELL SANITARY VISCOLIZER in the plant of Ewing Von-Allman Company, Louisville, Ky. This Viscolizer is employed in the processing of ice cream mix and condensed milk.

THE NEW AND TRULY SANITARY
VISCOLIZER



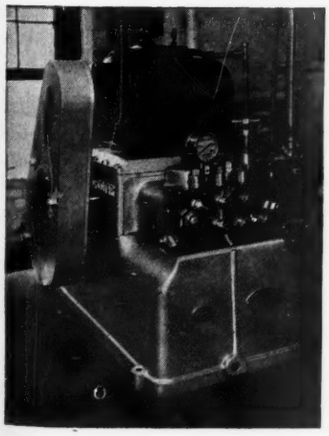
Swings into its Stride!

IT IS no exaggeration to say that the acceptance of the new CHERRY-BURRELL VISCOLIZER has been both immediate and nation-wide. Already you see them everywhere, in plants of all types, and on all types of work.

The viscolization of milk, ice cream mix, condensed milk and a host of other liquid and semi-liquid food products now becomes truly practical and desirable.

This NEW CHERRY-BURRELL VISCOLIZER is truly sanitary . . . as easy to clean and keep clean as any other of the simplest items of equipment, as you will at once grasp when you note these new and definitely superior features which have been worked out for you:

1. Rustless Stainless Steel (18-8) Cylinder Block. 2. Removable one-piece packing. 3. No threads on the inside of the cylinder. 4. All ports and chambers readily accessible. 5. Specially hardened stainless plungers which are easily removed. 6. Cylinder that can be completely taken apart and re-assembled in less than a half hour. 7. Cylinder that can be conveniently removed from machine. 8. Sanitary packing boxes that can be easily washed and sterilized. 9. All passages highly machined to a smooth finish.



Above is a No. 536 CHERRY-BURRELL SANITARY VISCOLIZER employed in processing ice cream mix and condensed milk for the Goshen Milk Condensing Company of Goshen, Indiana.

In the lower photograph is a No. 53[illegible] on ice cream mix in the plant of the Malvern Dairy, Washington, D. C.

APPROVED BY HEALTH OFFICIALS

This New Viscolizer has been approved by some of the most exacting health officials in the country. It is available in the following capacities: 100, 200, 300, 500, 800 and 1,000 gallons per hour. Send for literature illustrating and describing this latest development of our engineers.

CHERRY-BURRELL CORPORATION 427 W. RANDOLPH ST., CHICAGO

The PURCHASING AGENT tried to tell them

—that better containers cost less

EXPERIENCE has taught many purchasing agents that *price* doesn't determine the value of a shipping container. The important factors are: "How well does it do the job, and at what *net cost?*" Bemis Waterproof Bags give perfect protection to your product—and usually at a much lower cost.

Deterioration in transit or storage is stopped when you ship in Bemis Waterproof Bags. There is no sifting, odor, dust, or change in moisture content. Your product comes through in factory-perfect condition.

There is a *type* of Bemis Waterproof Bag for every industry. They provide any degree of protection required. And users profit by important savings in original cost, freight, handling, storage, and labeling.

It will cost you nothing to investigate Bemis Waterproof Bags, and it may solve your shipping problem. Write for further information on the application of these up-to-date containers to your particular industry.

BEMIS BRO. BAG CO.

402 POPLAR STREET
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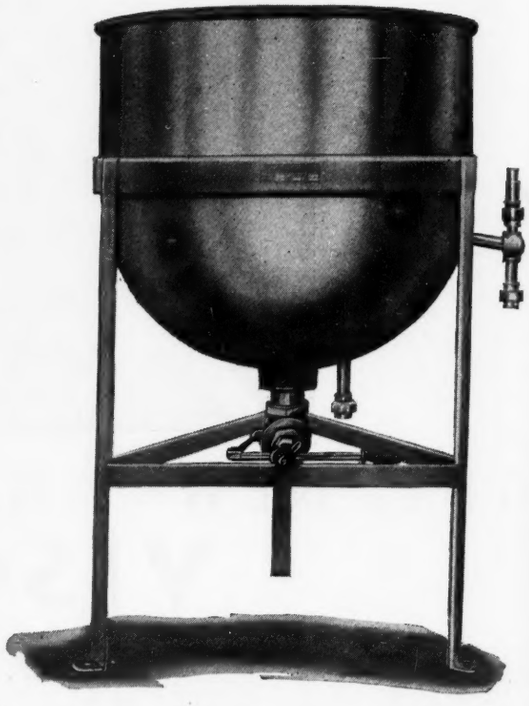
BEMIS *Waterproof* BAGS

THE YARDSTICK

The Standard by which Values are Measured



LEE STEAM JACKETED KETTLES

There are yardsticks for industries, for products, for equipment, for men—yardsticks with which to measure values and establish standards of comparison.

Talk with executives and production men in the food industries and you'll find that their yardstick, for Steam Jacketed Kettles, Vacuum Pans, Bowls, Tanks and similar processing apparatus, is their LEE EQUIPMENT.

You will profit when you buy Lee Equipment made of stainless steel, nickel or Monel metal. It is fabricated by master craftsmen, specialists in their field, and it looks as good as it is. It is efficient equipment, long-lived, economical—quality equipment you can install with the certainty it will more than pay for itself.

Send for complete information.

LEE METAL PRODUCTS CO.
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PHILLIPSBURG PENNSYLVANIA

Regular "hosing down" in packing rooms, canning rooms, killing floors, never bothers an F-M splash-proof motor. For here's a motor that "can take it"!

Smooth, trouble-free operation, under conditions that would cause rapid deterioration in ordinary motors, is guaranteed.

There's special protection at every point . . . a new type of ventilation system . . . a totally enclosed cast frame . . . perforated baffles . . . specially designed air ducts . . . moisture-resisting insulation . . . one-piece pressure cast rotors in small and medium size motors . . . welded stator coil connections . . . sealed cartridge-type ball bearings, and a host of other features.

As for cleanliness—continue to wash your machines with the hose but specify F-M splash-proof motors. For full information, address Department O-641, Fairbanks, Morse & Co., 900 S. Wabash Avenue, Chicago, Ill. 34 branches at your service throughout United States.

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FAIRBANKS-MORSE F-M

106 YEARS OF PRECISION MANUFACTURING

Motors

POWER, PUMPING AND WEIGHING EQUIPMENT

MATERIALS FOR THE FOOD MANUFACTURER

DIRECTORY

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....for BETTER SEASONING use FRITZSCHE'S ESSENTIAL OILS

"A Flavor for Every Purpose"

Manufacturers of mince meats, pickles, catsup, condiments, meat products and prepared foods generally, will find them more satisfactory and more economical to use than herbs and spices. We offer expert service and advice to those interested.

FRITZSCHE Brothers, inc.

315 WEST 8TH STREET LOS ANGELES CAL. — PORT AUTHORITY COMMERCE BLDG. 76 NINTH AVENUE, NEW YORK, N. Y.

Preparateurs et PARFUMEURS de SPECIALITES Fritzsche, Freres — FRITZSCHE BROTHERS, of Canada, Ltd. 77-79 Lorne St. Toronto, Canada — 110 WEST OHIO ST. CHICAGO, ILL.

Monsanto PRODUCTS FOR QUALITY IMPROVEMENT

Include:

Saccharin Monsanto — The Ideal Sweetener.

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Methyl Salicylate Monsanto — To Impart Wintergreen Flavor and Aroma.

Phosphates-Trisodium, etc. — And Phosphoric Acid—Food Grade.

Sodium Benzoate U. S. P. — Pure Preservative.

CHEMICALS OF QUALITY — Monsanto — ST. LOUIS, U.S.A.

Write us for detailed information.

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New York Chicago Boston Cleveland Charlotte Birmingham San Francisco Montreal

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"There is a COCOA for Every Purpose."

Semi-Cocoas	Extra Dry Cocoas
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Baking	Dusting Powder
Beverages	Fertilizer
Cake Fillers	Household Use
Cattle Feed	Ice Cream
Biscuits	Icings
Crackers	Coatings
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Malt and Sugar Mix	Syrups
Cocoa Milk	Theobromine
Fudge	Thin Syrups
Devils Food Cake	

PEACOCK BRAND FOOD PRODUCTS SPECIALTIES

Actual Producers of
CERTIFIED FOOD COLORS

Manufacturers of
DRY ESSENCE OF NATURAL SPICES
For condimentation of all food products

Also a complete line of
FLAVORING MATERIALS

Wm. J. Stange Co.
CHICAGO

VINEGAR

Pickles; pickled meats, fish, fruits and vegetables; salad dressings and mayonnaise, represent the bulk of the market for vinegar. Confectioners, canners and manufacturers of other food products also use it.

Tapioca Flour
Pearl Tapioca
Granulated and Flake Tapioca
Egg Albumen
Egg Yolk
Corn Starch
Rice Flour
Soya Bean Flour
Pure Food Dextrines

STEIN, HALL & COMPANY, Inc.
285 Madison Avenue, New York

SH — Est. 1858

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Intense Coverage in any Section or the Entire Nation

How much of the national market are you covering?

How much additional territory could you cover profitably?

The National Brokerage Company can secure distribution for your product and give you intense coverage in any section of the country or in all sections—efficiently and economically.

It offers manufacturers of food products or grocery specialties a practical, close-contact, result-getting service without waste or lost motion. A service that will definitely increase sales and keep them on the upgrade profitably.

Charges are nominal, based on actual sales.

Inquiries are invited from manufacturers whose products are suitable for wide distribution.

National Brokerage Company

A National Sales Organization

Edward M. Power, Jr., *President*

OLIVER BUILDING -:- PITTSBURGH, PA.

DR. B. LANGE PHOTO-ELECTRIC COLORIMETER

Price, in cabinet, including 3 cuvettes (100 ccm) and 8 color filters, **$225** f. o. b. N. Y.

FOR the rapid and objective determination of absorption and extinction values. Suitable for liquid volumes from 0.2-100 ccm; also test tubes and accessories for powders and solids. Color filters for measurement of spectral ranges. Monochromatic measurements by sodium vapor lamp, if desired. Absorption range from 0.1 to 100%.

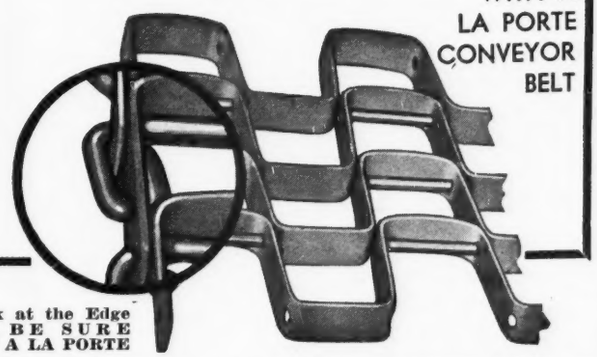
Particulars on request

Pfaltz & Bauer, Inc.

EMPIRE STATE BUILDING, NEW YORK

BRING YOUR CONVEYING EQUIPMENT UP TO DATE

WITH A LA PORTE CONVEYOR BELT



Look at the Edge and BE SURE IT'S A LA PORTE

THE ordinary limitations of other types of conveyor belting are transformed into economy, durability and efficiency in this modern conveyor belt that meets every requirement. Long after other belts are ready for replacement, this revolutionary belt continues to render peak-production service.

It will not creep, weave or jump on sprocket nor wear edges and pulley stands. It will not stretch. It is corrosion, heat and acid resisting. And in addition, it is easily repaired under a break. Periodical cleaning with steam or boiling water insures a maximum sanitary condition. Furnished in any length and practically any width.

If your Mill Supply House can't Supply you, write TODAY!

LA PORTE FLEXIBLE LONG WEARING STEEL CONVEYOR BELTS

LA PORTE MAT & MFG. CO.

305 BRIGHTON ST. LA PORTE, INDIANA

Built to Stand THE TEST OF TIME

Dependable service from water producing equipment is demanded by all Food Plant executives. For more than fifty-three years Layne Wells and Pumps have been built to stand the unmerciful test of time. Today, their performance record remains unbroken—a commendable tribute to skillful engineering and successful installation methods.

The world-wide experience of our hydrological engineers is offered to all who face water production problems. No obligation. For illustrated literature, write Layne & Bowler, Inc., Dept. L, Memphis, Tenn.

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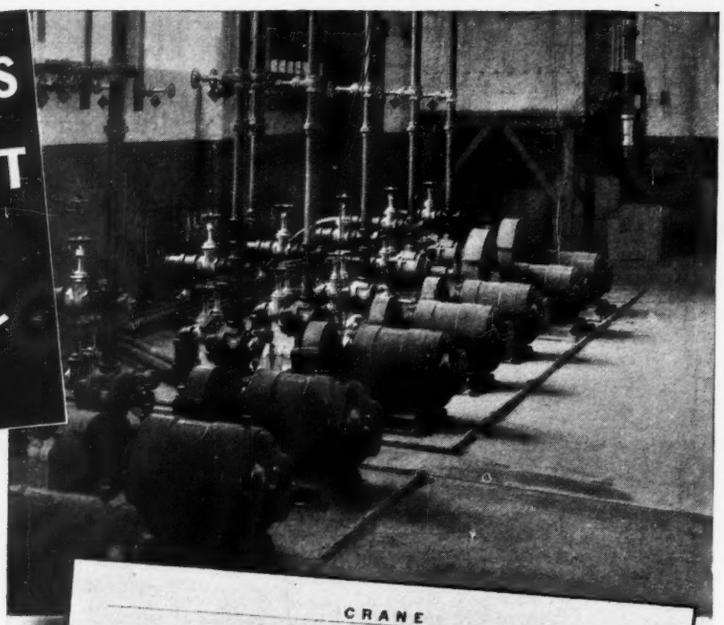
LAYNE-ARKANSAS CO., STUTTGART, ARK.—LAYNE-ATLANTIC CO., NORFOLK, VA.—LAYNE-CENTRAL CO., MEMPHIS, TENN.—LAYNE-NORTHERN CO., INC., MISHAWAKA, IND.—LAYNE-LOUISIANA CO., INC., LAKE CHARLES, LA.—LAYNE-NEW YORK CO., INC., NEW YORK CITY—LAYNE-NORTHWEST CO., MILWAUKEE, WIS.—THE LAYNE-OHIO CO., COLUMBUS, OHIO—LAYNE-BOWLER NEW ENGLAND CO., BOSTON, MASS.—LAYNE-TEXAS CO., HOUSTON, TEX.—LAYNE-WESTERN CO., KANSAS CITY, MO., CHICAGO, ILL., AND MINNEAPOLIS, MINN.—INTERNATIONAL WATER SUPPLY LTD., FORT ERIE, N., ONTARIO, CANADA.

LAYNE PUMPS
LAYNE WELL WATER SYSTEMS

SUSTAINED TIGHTNESS DESPITE FREQUENT *Operation*



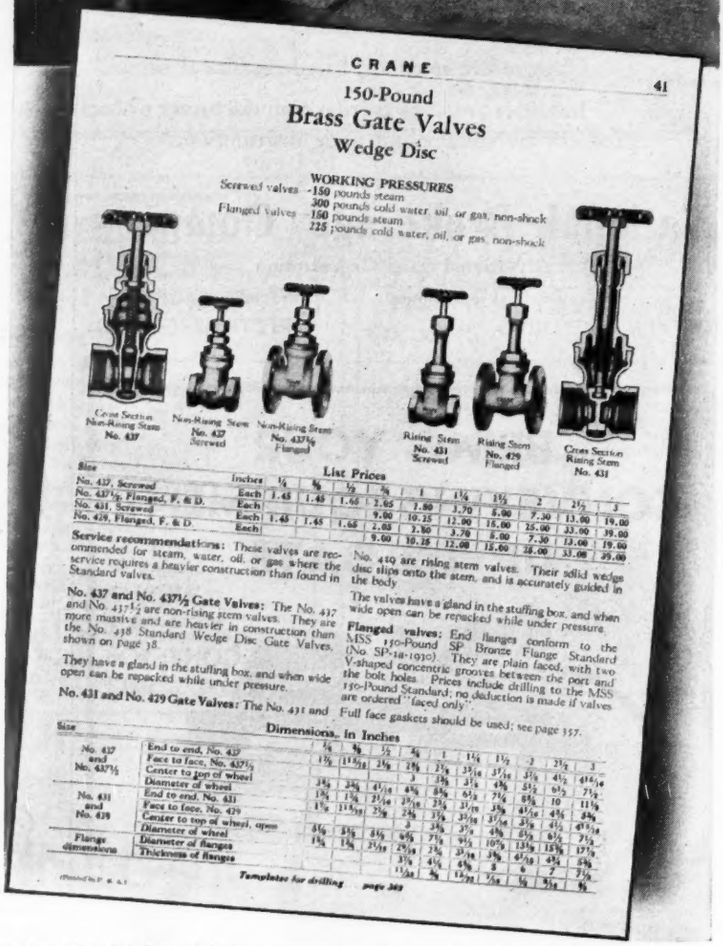
● In the canning or food plant leaky valves mean not only excessive maintenance costs but paralyzing delays and even spoilage.

The necessity for frequent opening and closing of valves cannot be avoided, but leaky valves can be replaced with valves that will stay tight despite frequent manipulation.

For this purpose Crane Co. offers its No. 431 Brass Wedge Gate Valves, the discs of which are especially machined and ground to provide extra allowance for wear. Precision guides prevent rubbing action between disc and seat during closing and opening. Generous stem-thread engagement insures long life for the threads. Strength and precision in all parts and numerous refinements in design contribute still further to this valve's dependability.

Scientific selection of materials, correct design and precision workmanship are factors which make for dependability in Crane valves and fittings. The line is complete. It includes sanitary valves and fittings of 18-8 chrome nickel alloy.* The Crane branch or distributor in your city can serve you.

Let Profits Pay for Plant Improvements. Use the Crane Finance Plan.



CRANE 41

150-Pound
Brass Gate Valves
Wedge Disc

WORKING PRESSURES
Screwed valves—150 pounds steam
300 pounds cold water, oil, or gas, non-shock
Flanged valves—150 pounds steam
225 pounds cold water, oil, or gas, non-shock

Cross Section Non-Rising Stem No. 437 | Non-Rising Stem No. 437 Screwed | Non-Rising Stem No. 437½ Flanged | Rising Stem No. 431 Screwed | Rising Stem No. 429 Flanged | Cross Section Rising Stem No. 431

List Prices

Size	Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
No. 437, Screwed	Each	1.45	1.45	1.65	2.05	2.80	3.70	5.00	7.30	13.00	19.00
No. 437½, Flanged, F. & D.	Each				9.00	10.25	12.00	15.00	25.00	33.00	39.00
No. 431, Screwed	Each	1.45	1.45	1.65	2.05	2.80	3.70	5.00	7.30	13.00	19.00
No. 429, Flanged, F. & D.	Each				9.00	10.25	12.00	15.00	25.00	33.00	39.00

Service recommendations: These valves are recommended for steam, water, oil, or gas where the service requires a heavier construction than found in Standard valves.

No. 437 and No. 437½ Gate Valves: The No. 437 and No. 437½ are non-rising stem valves. They are more massive and are heavier in construction than the No. 438 Standard Wedge Disc Gate Valves, shown on page 38.

They have a gland in the stuffing box, and when wide open can be repacked while under pressure.

No. 431 and No. 429 Gate Valves: The No. 431 and No. 429 are rising stem valves. Their solid wedge disc slips onto the stem, and is accurately guided in the body.

The valves have a gland in the stuffing box, and when wide open can be repacked while under pressure.

Flanged valves: End flanges conform to the MSS 150-Pound SP Bronze Flange Standard (No. SP-1a-1930). They are plain faced, with two V-shaped concentric grooves between the port and the bolt holes. Prices include drilling to the MSS 150-Pound Standard; no deduction is made if valves are ordered "faced only."

Full face gaskets should be used; see page 357.

Dimensions, in Inches

Size		¼	⅜	½	¾	1	1¼	1½	2	2½	3
No. 437 and No. 437½	End to end, No. 437										
	Face to face, No. 437½	1⅞	1 15/16	2⅛	2⅜	2⅝	3⅜	3 15/16	4⅞	5⅛	6⅛
	Center to top of wheel				3	3⅜	3⅝	4⅜	5½	6½	7½
	Diameter of wheel	3⅛	3⅛	4 1/16	4⅝	5⅛	6½	7½	8⅝	10	11⅛
No. 431 and No. 429	End to end, No. 431	1⅝	1⅞	2 1/16	2 7/16	2¾	3 1/16	3⅝	4 5/16	4⅝	5⅜
	Face to face, No. 429	1⅝	1 15/16	2⅛	2⅜	2⅝	3 1/16	3⅝	4 5/16	4⅝	5⅜
	Center to top of wheel, open				3	3⅜	3 29/32	4 11/16	5⅝	6⅛	7⅛
	Diameter of wheel	3⅛	3⅛	3½	4⅝	5⅛	6⅜	7⅛	8⅝	9½	11⅛
Flange dimensions	Diameter of flanges	1⅝	1⅞	2 1/16	2 7/16	2¾	3 1/16	3⅝	4 5/16	4⅝	5⅜
	Thickness of flanges				3/16	7/32	1/4	9/32	5/16	11/32	3/8

Templates for drilling page 349

Crane No. 431 Gate Valves on pump lines. For complete description, service recommendations, prices and dimensions see page 41, new Crane No. 52 Catalog.

*Licensed under patents of Chemical Foundation, Inc.

CRANE

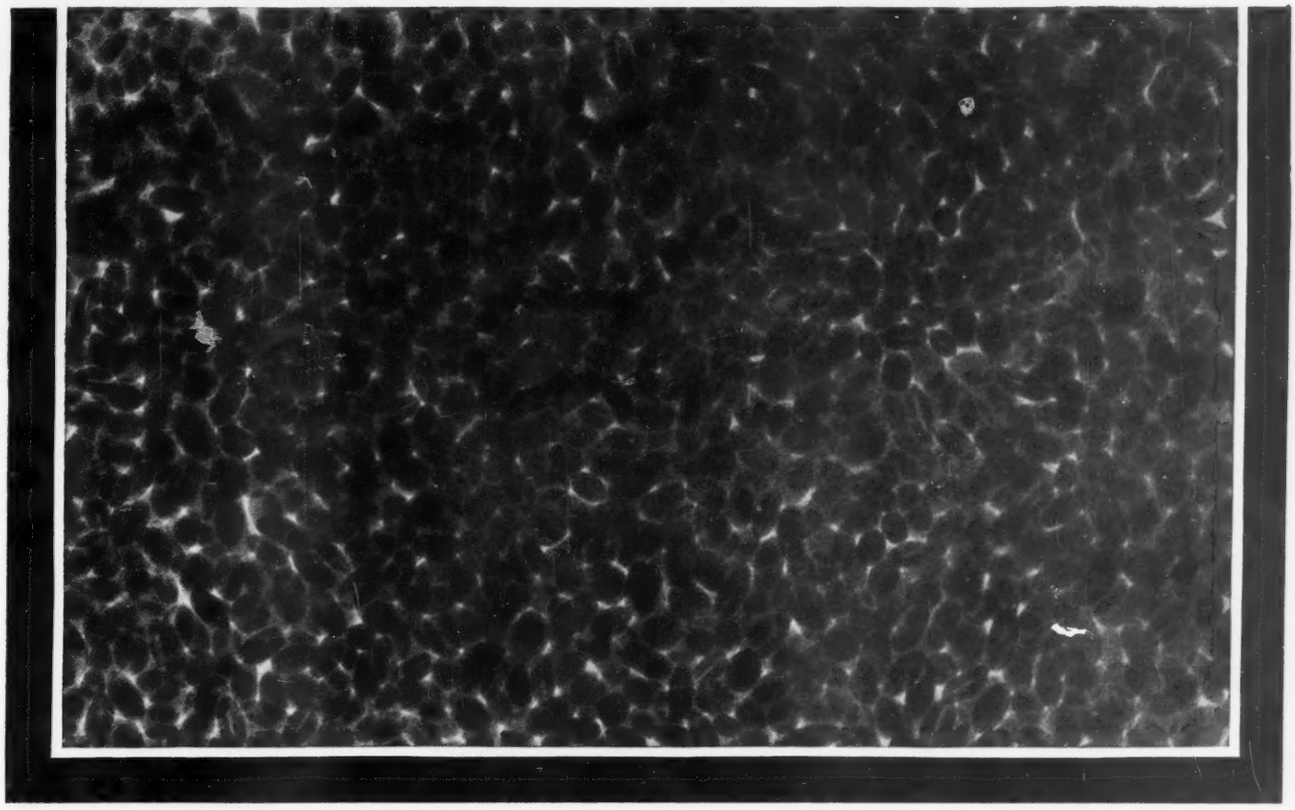
CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO, ILLINOIS · NEW YORK: 23 W. 44TH STREET

Branches and Sales Offices in One Hundred and Sixty Cities

VALVES, FITTINGS, FABRICATED PIPE, PUMPS, HEATING AND PLUMBING MATERIAL

NEW X-RAY DEVICE GIVES ADDED PROTECTION

To You and Your Customers



▲ ▲ ▲

Here is an image as seen on the x-ray viewing screen. Stones and dirt balls, appearing as dark spots, are easy to recognize as bulk beans (shown in this view), peanuts, coffee beans, or similar materials are run through the x-ray inspection equipment on the conveyor belt.

WHETHER you are looking for a way to locate and remove foreign bodies from your raw materials, or to find and eliminate imperfections from the finished product, the new G-E Visual Inspection X-Ray Unit and Conveyor System provides the modern method of examination that protects you and your customers against imperfections in foods.

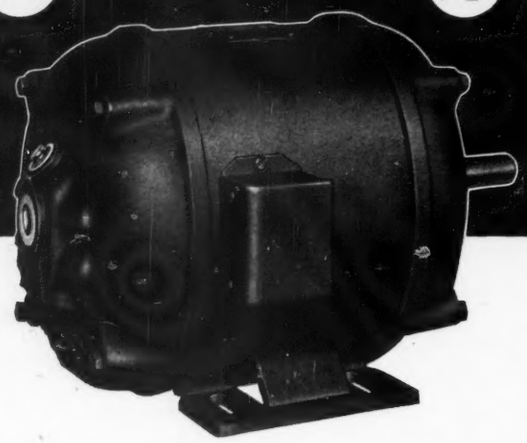
More effective, more certain than any other non-destructive test, x-ray shows defects and foreign material inclusions that can be found only by a method which makes it possible for you to see them. And the new G-E x-ray unit, with its conveyor system built in, provides the money-saving and confidence-building advantages at a cost far less than the worth of the results.

The unit is constructed specifically for use in food products plants—easy to keep clean, simple to operate, strongly built of selected materials to give reliable service over a long period of time. Write now, outlining your food inspection problems and ask for the bulletin describing the G-E Visual Inspection X-Ray Unit and Conveyor System. Address Dept. I512, General Electric X-Ray Corporation, 2012 Jackson Blvd., Chicago, Illinois.

GENERAL ELECTRIC
X-RAY CORPORATION

INDUSTRIAL
Fractional Horse Power
POLYPHASE MOTORS

1/6 1/4 1/3 1/2 3/4



Meet Rigid Industrial Demands

Definitely designed and built to meet the most rigid *industrial* requirements and the exacting demands of heavy-duty continuous precision production—these fractional horse power Century Polyphase Motors fully measure up to every performance requirement of the tools and equipment they drive.

Quiet starting—Quiet running—Remarkable freedom from vibration—Harmonizing appearance—Built throughout to precision standards.

CENTURY ELECTRIC COMPANY
1806 Pine Street • • • St. Louis, Mo.
Offices and Stock Points in Principal Cities

SIZES UP TO Century MOTORS 600 HORSE POWER

RESULTS:

1. No more continuous tank watching

2. A closer check on product and output

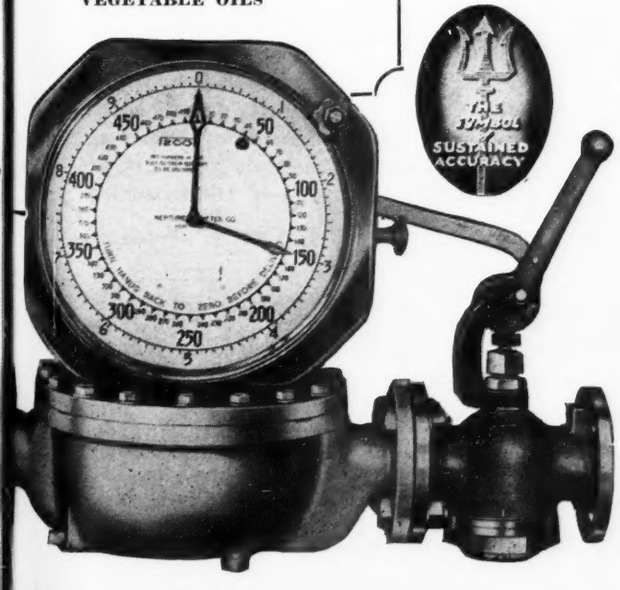
3. Eliminating discrepancies in quantities handled

About 50,000 gallons of vinegar, up to 10% acetic acid concentration, are handled by this Neptune Trident Liquid Meter at the Old Dutch Mustard Co., N. Y. City, and the meter has "fulfilled every expected need". The triple *result* of this installation is given above. It simply means that in this process, and any other process in the food industries in which any liquids are handled, YOU can get three definite results with these meters. You can (1) stop waste, (2) improve quality and (3) get absolutely uniform quality of finished product.

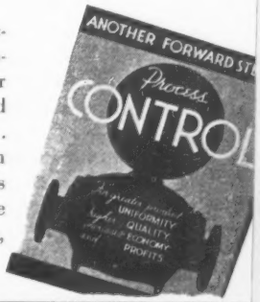
MUSTARD

is just one of the many products in which liquid can profitably be measured by Neptune Trident Liquid Meters. These include:

BAKERY PRODUCTS
BEVERAGES
ICE CREAM AND OTHER
MILK PRODUCTS
MEAT PRODUCTS
FLAVORING EXTRACTS
BRINES
PRESERVED FOODS
SUGAR SYRUPS
GLUCOSE
VINEGAR AND CIDER
CORN SYRUPS
FRUIT JUICES
TOMATO JUICES
MOLASSES
VEGETABLE OILS



There are Neptune Trident Liquid Meters for measuring practically any liquid. They are used for batch measurement, proportioning and blending, measuring product delivery and for cost accounting. Inquiries regarding Neptune Trident Liquid Meters are pouring in from a wide variety of food plants . . . fill in and send the coupon here, now, for complete data on these Meters, fine precision instruments produced by the world's largest exclusive manufacturers of liquid meters. If you desire further cooperation on their application or installation and use, do not hesitate to call on our Technical Staff for service.



The NEPTUNE AUTO-STOP METER

Is made for special batch control. It delivers exactly a selected quantity of liquid, then AUTOMATICALLY stops delivery. The savings it has effected are remarkable . . . write us for details.

Send coupon today for data

NEPTUNE METER COMPANY, 50 West 50th St., New York N. Y. Without obligation, please send information on accurate measurement and prevention of waste in handling

..... (insert liquid)

in processing .....(insert food product)

Name .....

Position .....

Company .....

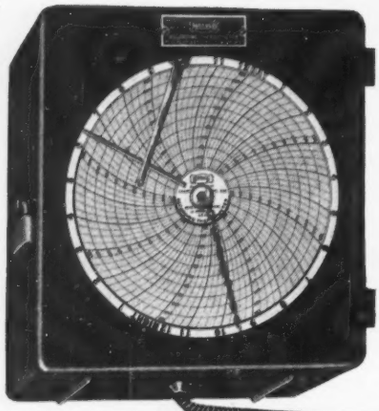
Street .....

City ..... *State* .....

1236

MOTOCO

INDUSTRIAL THERMOMETERS



RECORDING THERMOMETER
MODEL 500
$31.00
LIST PRICE

DIAL INDICATING THERMOMETER
MODEL F1
$20.00
LIST PRICE

● Wherever frequent checking of temperatures is an essential function in the preparation and preservation of foodstuffs, Motoco Instruments have found a ready acceptance—Motoco's dependability and accurate temperature indication assures most economical and efficient operation.

The Motoco Solid Liquid Filled movement is of exclusive design. Delicate hair springs, gears, pinions, etc., have been eliminated thus resulting in a sturdy one to one ratio movement which will give long life service under the most severe operating conditions.

Motoco Instruments are custom made for every application, assuring you of satisfactory operation on your equipment.

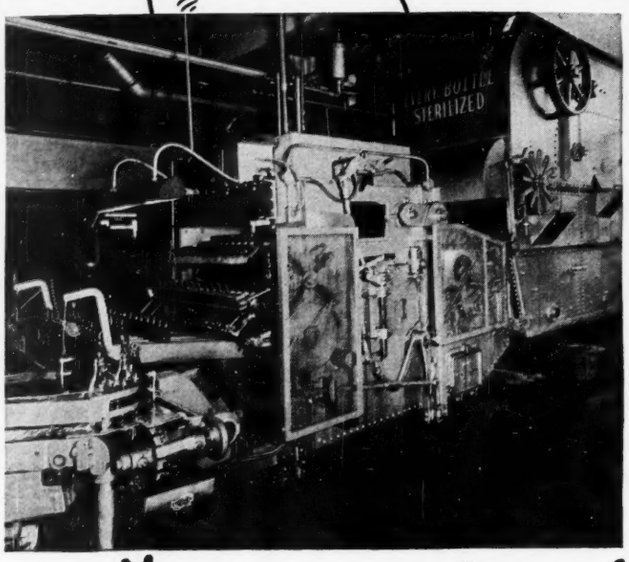
A postcard or letter request will bring you complete details of the Motoco line.

MOTOMETER

THE ELECTRIC AUTO-LITE COMPANY
MOTO METER GAUGE & EQUIPMENT DIV.
CHRYSLER BUILDING · NEW YORK CITY, N. Y.

IT'S EASY

to get BOTTLES that sparkle



... this improved way!

THE new alkali, Metso, sodium metasilicate* added to your soaker caustic solution gives you bottles that fairly glisten, they are so brilliant. Gone is the fog and haze that make bottles dull. Metso is a free-rinser.

A cleaner, more sterile bottle too, is certain because: (1) Metso's sustained alkaline power quickly removes all dirt. (2) Metso with caustic soda has been proved a speedier germicide than any other alkaline solution.

It is easy to get such results—just use 40% of Metso with 60% of your regular caustic soda. And it actually saves you money. Leading bottlers and dairies find that this combination *reduces* the washing cost per 1000 bottles.

● *Write today for a free sample of Metso.*

*U. S. Pat. No. 1898707

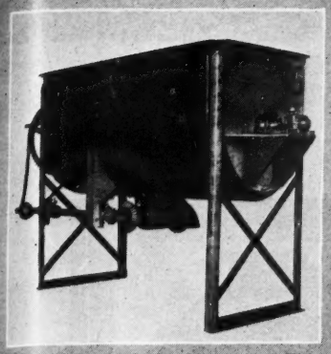
METSO CLEANERS

FOR QUICK, THOROUGH CLEANING AT LOW COST

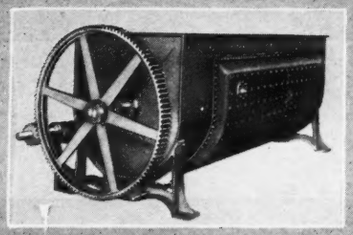
PHILADELPHIA QUARTZ COMPANY

General Offices and Laboratory: 125 S. Third St., Philadelphia, Penna.
Chicago Sales Office: 205 W. Wacker Drive. Stocks in 60 cities.
Works: Anderson, Ind., Baltimore, Md., Chester, Pa., Buffalo, N. Y., Kansas City, Kans., Rahway, N. J., St. Louis, Mo., Utica, Ill.

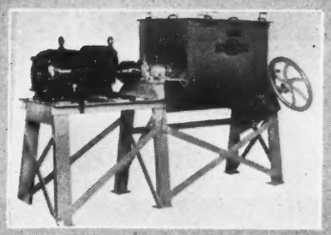
METSO
ACTIVE ALKALI
REG. U.S. PAT. OFF.



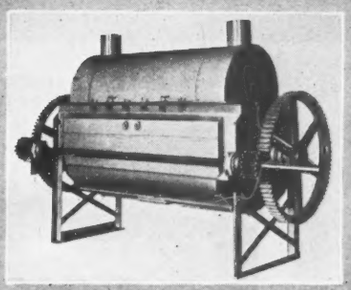
All steel steam jacketed mixers. This one with special discharge for filling cans direct from mixer.



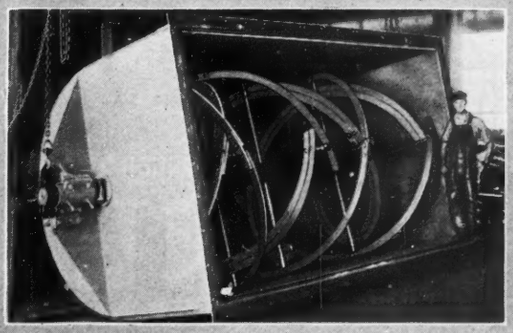
Another type-steam jacketed, used for dry powders, semi-liquids and liquids.



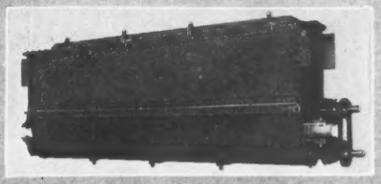
Tilt type mixers. Facilitates cleaning and discharging. Particularly well suited to many materials.



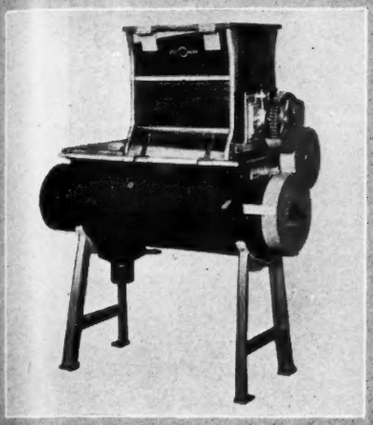
Still another type steam jacketed mixer. This one equipped with special vented hood.



Horizontal batch mixers. All sizes, as well as all types. This one of largest—550 cu. ft.



Continuous mixers, all types. This one has double action.

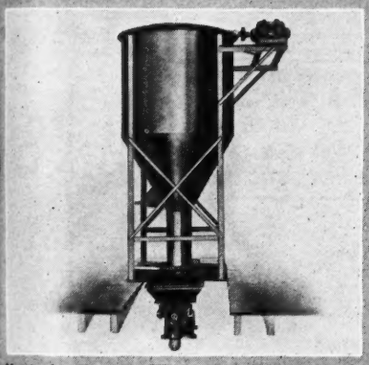


This one, one of smallest—3½ cu. ft.—shown with brush sifter to break up lumps, etc.

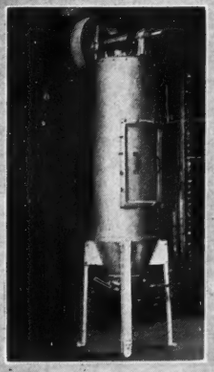
AMERICA'S MOST DIVERSIFIED LINE OF MIXERS

A Sprout-Waldron recommendation is made only after consideration of the adaptability to the individual problem of each type machine shown on this page, as well as others not shown. Result: a guarantee of accurate blending, economical operation, least possible first cost and smallest floor space requirement. An inquiry can very possibly mean greater profits and more sales—it never obligates.

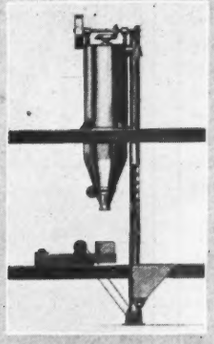
Vertical liquid mixers, jacketed. Those illustrated specially built for cellulose plant.



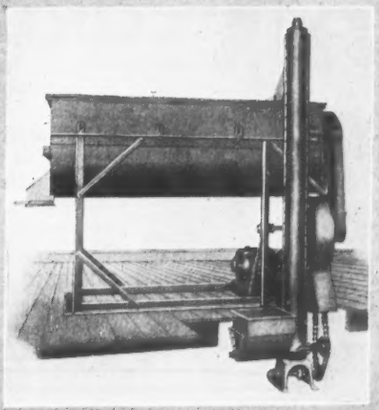
Vertical mixers. This one self-contained (loads, mixes, sacks). Has many advantages for average work.



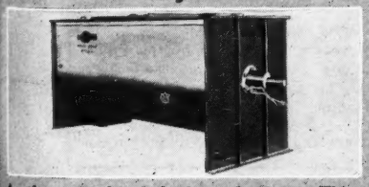
All sizes vertical mixers. This one of smallest, self-cleaning.



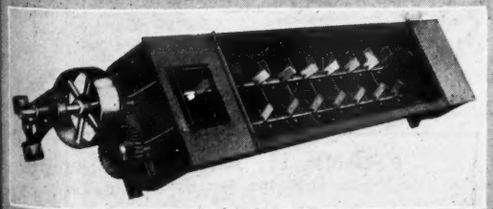
One of four different types of vertical mixers, requiring little floor space, small power.



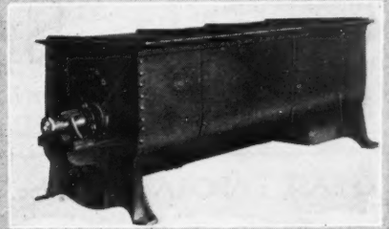
Self-contained horizontal batch mixer—loads, mixes, sacks.



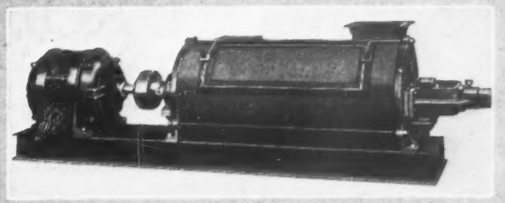
Another type batch horizontal mixer. This one all steel, available with five different styles of agitator.



Another continuous type mixer. Insures intimate co-mingling while conveying. Has many applications.



Another horizontal batch mixer. Secures most intimate blends of all dry materials, also applicable to many liquid and semi-liquid requirements.



Mixers for blending viscous liquids with dry materials, continuous principle.

SPROUT, WALDRON & COMPANY

Crushing, Grinding, Mixing, Sifting, Packing, Elevating and Conveying Machinery

30 WALDRON STREET, MUNCY, PENNA.

REPLACE THOSE OLD TRAPS WITH
RELIABLE, LONG-LIVED MULTIPORT DRAINERS

Put an end to the waste and inefficiency caused by entrained liquids in process steam.

Cochrane Multiport Drainers assure continuous removal of condensate and the delivery of hot, dry steam to the point of usage. This means rapid, uninterrupted process operation, resulting in a substantial saving in time and money.

Write—now—for detailed information

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FOR PROCESS STEAM CONTROL
COCHRANE

COCHRANE MULTIPORT DRAINER

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POSITIVE METHOD OF
INSECT CONTROL

No insect, its eggs, larvae or pupae can survive fumigation with Proxate. Penetrates porous coverings . . . no odor, taint or residue. Not dangerous to humans . . . non-flammable . . . non-explosive. Easy to use. Write for Proxate Booklet.

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The FINDLAY CARTON HANDLING SYSTEM
SAVES
Handling Costs as much as 65%
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and
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The Findlay Carton Handling System
"It Pays For Itself"
SELF-LIFTING PIANO TRUCK CO., FINDLAY, OHIO

PATTERSON
TYPE "E" MIXER with UNIPOWER AGITATOR and "EA" STIRRER

Any size available in steel, stainless steel—any non-ferrous metal or wood with any agitator and stirrer — Belt or Motor Driven. Write for complete mixer catalog.

The Patterson Foundry & Machine Co.
East Liverpool, Ohio, U. S. A.

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Food Industries
330 West 42nd Street, New York City

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PEASE LABORATORIES, Inc.

Food Processing, Nutritional, Chemical and Bacteriological Research

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Give Your Products MAXIMUM SALES VALUE by using containers and closures of

J&L TIN PLATE

Maximum sales value and greater profits are two important advantages you get when you use containers and closures made of J&L Tin Plate.

J&L Tin Plate gives you these advantages because it lends itself readily to the production of containers and closures of distinctive design and appearance—containers and closures that help sell your products.

J&L Tin Plate can do outstanding packaging jobs for you because:

1. It has a uniformly clean and smooth surface that takes lithographing perfectly.
2. It is uniform in gage.
3. It is properly heat treated.
4. It is uniformly tinned.

All of these special qualities, which are the direct result of the extreme care exercised in the manufacture at the mill, make possible the production of containers and closures *that help sell your products.*

Many users in the packaging field specify J&L Tin Plate because they know from experience that it meets their requirements for containers and closures of maximum sales value. Specify J&L Tin Plate for *your* needs, and you will be sure of added sales value and greater profits.

JALCOLD—a cold-reduced special purpose plate of increased ductility and exceptional capacity for deep drawing operations. Then, too, its unusual flatness, uniformity to gage, and perfect cleanliness assure faithful reproduction of intricate color lithographing and package design.

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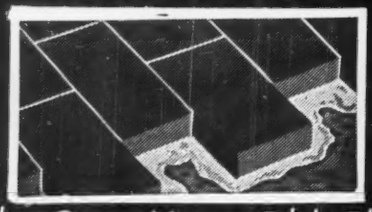
*Operated by National Bridge Works Division of Jones & Laughlin Steel Service, Inc.

Canadian Representatives: JONES & LAUGHLIN STEEL PRODUCTS COMPANY, Pittsburgh, Pa., U. S. A., and Toronto, Ont., Canada

BETTER FLOORS



"Right Over Your Old Floors"

DREHMANN FLOOR BRICK

Build sanitary, safe, durable floors—lifetime floors—with Drehmann Floor Brick—the hard, tough brick that stands up under hard service and costs little or nothing to maintain. Let us show you why "Better Floors" are cheaper floors.

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PHILADELPHIA, PA.

Tioga & Gaul Sts. Philadelphia, Pa. | 205 W. Wacker Drive Chicago, Illinois | 545 Fifth Ave. New York, N. Y.

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CAROTENE *under the microscope!*

● When it comes to giving a food or drug product a new sales and health appeal—carotene, (vitamin A of carrots, butter, etc.) is the "Golden" vitamin not only in color but in selling power.

This "fortifier" is nature's own prophylactic agent which aids in maintaining a healthy condition of vital mucous membranes throughout the body and helps build good resistance.

"Provatol" (Eff Brand of carotene) is prepared from vegetable sources, hence no fishy taste. Low cost, no royalties, no special machinery or other involvement. Fortify your product and sales with Provatol.

Full particulars sent without obligation

EFF LABORATORIES, Inc.

418-B Republic Building, Cleveland, Ohio.
Phone: CHerry 5644 — Cable: EFFLAB

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PROCTOR DRYERS

bring

Greater Hourly Output
Lower Cost Operation
Higher Quality Results

If you are a large manufacturer of a food product, that requires drying in some stage of its production, you naturally want equipment that accomplishes something more than just *drying*. There are important benefits and economies to be realized through speed of production, minimum floor space requirement, lowered steam consumption and assured superiority of results. The unparalleled experience of Proctor engineers enables them to design and build dryers that offer these advantages and *more*. Write.

PROCTOR & SCHWARTZ, INC.
PHILADELPHIA

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The Food Industries are their own best customers

Practically every Food Manufacturer depends upon some other branch or branches of the Food Field as a source of his Raw Materials.

Many of these Materials are now advertised in a Special Section in this issue under the heading—

MATERIALS

FOR THE FOOD MANUFACTURER

ROBINSON

CRUSHERS, GRINDERS and PULVERIZERS

GARDNER and UNIQUE MIXERS

GYRO-SIFTERS, LEVEL-SIFTERS and REELS

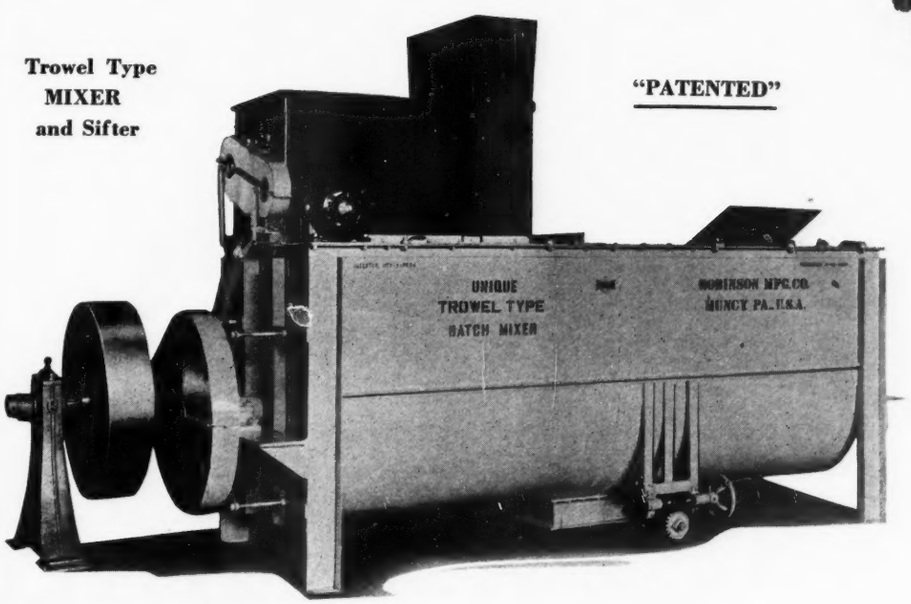
ELEVATORS and CONVEYORS

ALL GEAR UP FOR PROFIT

In Many of The Country's Finest Food Processing Plants —

Trowel Type MIXER and Sifter

"PATENTED"



This Trowel Type Mixer is in extensive use mixing prepared flour for doughnuts, biscuits, cakes, cookies, waffles, etc., and is unexcelled for intimately associating oils and liquids with dry powders for bakery, confectionery, and creamery products such as meringues, fondants, cream powders, custards, puddings, sauces, soft drink powders, chocolate milk, sweetened cocoa, etc. Our line of Mixers also includes Liquid and Semi-Liquid Mixers for various types of syrups, salad oils and dressings, light soups, flavorings, etc.

While we are well known throughout the Food Industry as builders of a most complete line of Mixers, yet our line of complete Food Processing Equipment includes a wide variety of Crushers, Grinders, Pulverizers, Sifters, and Material Handling Equipment. Successful operation in hundreds of plants is proving the superiority of "UNIQUE" design and construction far better than anything we can say in print, but sales literature is available on all UNIQUE Equipment and will be furnished promptly on request.

Call Muncy 145 on the telephone or dictate a letter telling what you wish to accomplish. Our engineers will be glad to cooperate in the effective solution of any troublesome food processing problem.

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Complete Food Processing Equipment—PLUS—A Helpful Engineering and Advisory Service

NO MATTER HOW *Fine* OR **COARSE**—

From metallic filter cloth to the coarsest of wire screens . . . Roebling Wire Fabrics are available for washing, sorting, grading, conveying, and processing purposes. They are made in a wide variety of metals such as steel, Stainless Steel, galvanized steel, Monel Metal, brass, copper, phosphor bronze, etc.

These wire fabrics can be furnished to meet a wide variety of requirements including, in part . . . rigidity; flexibility; and resistance to wear, vibration, heat, water, steam, chemicals, fruit or vegetable juices.

Other Roebling Wire Fabric Products include wire baskets, wire trays, and wire cloth for safety guards.

We invite your inquiry for further information, samples, prices . . . or a copy of our latest Wire Fabrics Catalog.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*

Square Mesh Wire Screen

Oblong Mesh Wire Screen

ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY

"THIS MACHINE STAYS ON THE LINE"

Says Operator Ferguson

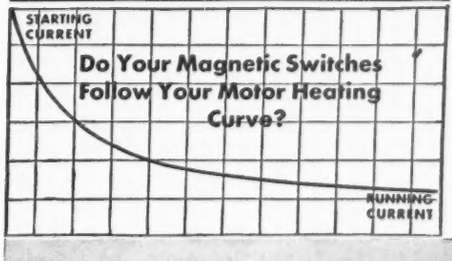
"G-E Switches Eliminate Unnecessary Shutdowns"

"IT'S not hard to see why my weekly pay checks got bigger when I came on this machine," he continues. "It's seldom tied up with overload shutdowns that reduce output and cost me money. You know, the fellow that made these switches must have figured they'd be used on piecework jobs where every second counts a lot. You can bet that from now on, I'll try to stay on machines that have G-E magnetic switches."

Mr. Ferguson has the right idea, because these G-E magnetic switches were designed for jobs where it is important to keep the motor on the line through voltage dips or short overloads. The overload relay used on these switches protects your motor against harmful overloads. But it follows the motor heating characteristic, so the motor can continue in operation as long as the overload condition is harmless and of short duration.

In addition to this money-saving advantage, there are many other features of these switches that you will like. For instance, they are very easy to install. There is ample room inside the case for wiring, and the terminals are conveniently located. And you have only to lift out the arc chute to inspect the contacts. It will pay you—and please your operators—to equip your machinery with G-E control, and particularly with these efficient magnetic switches. General Electric Company, Schenectady, N. Y.

FULL PROTECTION ALL THE WAY WITH G-E MAGNETIC SWITCHES



General Electric Company
Dept. 6—201, Schenectady, N. Y.

I should like to know more about G-E magnetic switches. Please send me your Bulletin GEA-841E.

Name .....

Company .....

GENERAL ELECTRIC

SEARCHLIGHT SECTION

EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or RESALE

UNDISPLAYED—RATE PER WORD:

Positions Wanted (full or part-time salaried employment only), 5 cents a word, minimum $1.00 an insertion, payable in advance.
Positions Vacant and all other classifications 10 cents a word, minimum charge $2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads. Replies forwarded without extra charge.
Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 inch $5.00
2 to 3 inches..... 4.75 an inch
4 to 7 inches..... 4.50 an inch
Other spaces and contract rates on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page. Food Industries

POSITIONS WANTED

AS General Superintendent by Refiner of Corn Products, starch, corn syrup and sugar, dextrose, dextrine, table syrup, feed, and oil. Complete plant design. Supervision of engineering and manufacturing operation. PW-267, Food Industries, 520 No. Michigan Ave., Chicago, Ill.

SELLING OPPORTUNITIES
OFFERED—WANTED
Selling Agencies—Sales Executives
Salesmen—Additional Lines

OPPORTUNITIES OFFERED

DUTCH COCOA made in Holland open for connection with a National Sales Organization in New York City. RW-261, Food Industries, 330 West 42d Street, New York City.

SALESMAN OR SALES ENGINEER—An established manufacturer of a broad line of equipment for grinding, crushing, sifting, mixing, drying and other process and food manufacturing equipment, as well as auxiliary items for material handling and power transmission, has several large potential territories open. Commission basis. Excellent opportunity for man able to develop equipment applications to available markets. In replying give full particulars to territory with which you are familiar. SW-262, Food Industries, 330 West 42nd Street, New York City.

PROCESS & FLOUR MILL EQUIPMENT SALESMAN OR SALES ENGINEER. An established manufacturer of a broad line of equipment for grinding, crushing, sifting, mixing, drying and auxiliary items for material handling and power transmission has several territories open. Commission basis. Excellent opportunity for man able to develop equipment applications to available markets. In replying, give full details to territory with which you are familiar. SW-259, Food Industries, 330 West 42nd Street, New York City.

New "SEARCHLIGHT" Advertisements
must be received the 21st of the month to appear in the issue out the following month.
Address copy to the Departmental Advertising Staff
FOOD INDUSTRIES
330 West 42d St., New York City

Liquidation, Equipment and Real Estate of the
$10,000,000 SPRECKELS SUGAR CORP.

Partial List—Equipment in A-1 Condition—All Set Up

1—**Swensen Triple Effect, Copper Tube,** 2000 sq. ft. per effect.
5—**Vallez Rotary Filters,** No. 4, with 40—42" dia. bronze leaves, 3" centers, each 720 sq. ft.
6—**Oat Castiron Vacuum Pans;** 1—16' 1800 sq. ft.; 2—14' 6", 1500 sq. ft. each; 1—10', 600 sq. ft.; 1—10', copper body, 640 sq.ft.; all with copper coils.
1—**Hersey Hot Air Dryers,** 3'x10'.
1—**Complete Pneumatic Scale Co. Packaging Unit,** adj. 1 to 5 lbs. carton. 1 complete with wax lining unit.
Large Variety of Valves and Fittings, 2"x12".
175—**Motors,** each 30/60/220, 5 to 50 hp.
4—**150 hp. Syn. Westg.**
50—**Foote Speed Reducers,** motor driven.
Over 6000 of Belt, Gravity, Screw and Apron Conveyors.
3—**DC Generator Sets,** Engine Driven, each 75 kw. complete.
9—**500 hp. Heine Boilers,** 180 lb. press. with Murphy Stokers.
25—**Heaters and Heat Exchangers.**
Thousands of Items of Vacuum, Centrifugal and Steam Pumps, Crushers, Pulverizers, Scales, Engines, Steel Tanks, Transformers, Machine Shop Equipment, Mixers, Bag Closing Machines, Packaging Equipment, Laboratory Equipment, Business Machines, Office Equipment, etc.

Arrange to Visit Our Plant—Send for latest special illustrated edition of the "Consolidated Spreckles News." Send Your Inquiries to

CONSOLIDATED PRODUCTS—SPRECKELS LIQUIDATION
YONKERS, NEW YORK, U. S. A.
Telephone: Yonkers 2400 ***Cable Address:* "CONSPRECK"**

WANTED

Equipment Wanted
"Fort Wayne Agitating Sterilizer Model 36-A or larger."
W-260, Food Industries
520 No. Michigan Ave., Chicago, Illinois

WANTED
Can use two or three
Anderson Expellers
RB type or latest type machines. Must be cheap. Will pay cash.
W-266, Food Industries
330 W. 42d St., New York City

WANTED
Day or similar make **Dry Powder Mixer,** approximately 100 and 600 lb. capacity, also detachable agitators. Also **glass lined Tanks.** Will pay cash. Give full details, size and price.
W-265, Food Industries
330 W. 42d St., New York City

Buying Good Used Equipment
is frequently the difference between having good needed equipment or doing without it.

Guaranteed Rebuilt Equipment

6—40"x60" **Sprague-Sells** vertical retorts complete with crates and fittings
5—**Burt & Knapp** can labelers
5—**World, Ermold & National** bottle labelers
3—**Karl Kiefer** rotary **Bisco** fillers, gear & piston type
5—**Cake and Mayonnaise** mixers, **Hobart, Day, Read & Century** makes
Dry Powder mixers, with and without sifters, lab. size to 4000 lbs. cap.
Aluminum steam jack. kettles 10 to 175 gals. cap.
Copper steam jack. kettles 5 to 500 gal. cap.
2—100 gal. **Pfaudler closed glass lined steam jack. kettles**
2—200 gal. **Pfaudler closed glass lined steam jack. kettles**
1—**Day jack. "Jumbo" 1200 gal. mixer.**

MISCELLANEOUS — Glass Lined Tanks and Kettles, Filters, Filter Presses, Pony Mixers, Paste Mixers, Mills, Grinders, Pulverizers, Dryers, Pumps, Boilers.
SEND FOR "CONSOLIDATED NEWS" listing complete stock.

SPECIALS

1—48"x40" **Buffalo Flaker**
1—**Devine** 4'x9' Double Drum **Atmospheric Dryer**
1—**Buffalo** type F 20 **vacuum shelf dryer**
5—**W & P** size 30 Type X Class BS **jack, mixers,** 2650 gals.
2—**W & P** Size 15 Type VI Class BB **jack, mixers,** 100 gals. power tilting
2—**Anderson** No. 1 **Oil expellers**
1—500 gal. copper jack, **vacuum pan**

CONSOLIDATED PRODUCTS COMPANY, INC.
13-17 PARK ROW, NEW YORK CITY
Shops and Warehouse - - - 335 Doremus Avenue, Newark, N. J.

BUY WITH CONFIDENCE
"CONSOLIDATED"

UNION

Rebuilt Machinery

GUARANTEED REBUILT MACHINERY

25—Copper Coating Pans, with and without steam coils
1—Hurricane Dryer
1—Huhn Rotary Steam Dryer
6—Ermold, National and World Bottle Labelling Machines
50—Copper Steam Jacketed Kettles, 10 to 200 gal. capacity with and without agitators, tilting and stationary types
25—Dough type Mixing Machines, single and double arm, 1 to 10 bbl. capacity

SPECIALS

1—Colton No. 3 Tablet Machine with set of dies (excellent condition)
1—York 12 ton capacity Hi-Speed Ammonia Refrigerating Machine, late style construction.

Write or Wire For Prices & Information

Union Standard Equipment Co.
318-322 Lafayette St. New York

NEW AND USED

Steam Jacket, Copper Kettles

20 to 300 gal. capacity.

THOS. BURKHARD, INC.
494-496 Flushing Ave., Brooklyn, N. Y.
Coppersmiths Since 1836

SPACE IS VALUABLE

Too often you see idle machinery occupying valuable floor space. Advertising space in the Searchlight Section is available to help you sell equipment you do not need.

Write Today To:

Department Advertising Staff
330 West 42d Street, New York City

FOR SALE

1000 gal. Glascote glass lined tank. Jktd., agitated, and insulated.
36" **Buflovak,** single effect all copper evaporator or Vacuum pan.
42" **Pfaudler Vacuum Pan,** agit.
75 gal. **Pfaudler Jkt. Kettle,** agit.
100 gal. **Pfaudler Kettle,** jkt.
300 gal. **Elyria Tank,** 60"x24" agit.
500 gal. **Pfaudler Tank,** 54"x48" agit.
100 & 250 gal. **Homogenizers.**
100 & 300 gal. **Viscolizers.**
100 & 170 gal. **Copper Jkt. Kettles.**

Large stock of **Refrigerating Machinery,** also **Milk and Ice Cream Plant Equipment.**

Send Us Your Inquiries

ROBERT P. KEHOE MACHINERY COMPANY
1 East 42nd Street, New York, N. Y.

FOR SALE

3—100 gal. steam jacketed **Copper Kettles** with agitators.
15—**Alum. st. jac. Kettles** 20 to 100 gal.
50—**Copper st. jac. Kettles** 20 to 250 gal.
6—**Stokes & Smith** double unit automatic **Powder Filling Machines.**
1—4 spout **Filler Machine Co. Filler.**
3—**U. S. rotary Bottle Rinsers.**
5—**Bottle and Can Labeling Machines.**
10—**Hobart, Read, Triumph 3-speed Mixers.**
Dough and Powder Mixers, Bottle and Can Fillers, Filters, Filter Presses, Mills, Dryers, Pumps, Boilers, etc. Send us your inquiries, also your list of surplus equipment, which we purchase for cash.

LOEB EQUIPMENT SUPPLY CO.
618 Lake Street, Chicago, Ill.

GOOD USED POWER EQUIPMENT

Immediate Delivery—Substantial Savings
Boilers, Engines, Turbines, Generators, Motors, Compressors, Pumps, Transformers, Condensers, Converters, Fans, Speed Reducers, etc., etc.
Write for free copy of nationally advertised lists of equipment now available.

Departmental Advertising Staff
McGraw-Hill Pub.Co.,330 W.42d St.,New York,N.Y.

FOR SALE

100 gal. **Creamery Package Pasteurizer,** Motor Drive.
12 hole **Kelvinator Ice Cream Cabinet** with Compressor.
Triangle Bag Filler, Class SK, Motor Drive.
No. 1 **Sprague-Sells Process Steam Cooker** complete.
Automatic Potato Chip Fryer, Gas Fired.
80 qt. **Read, Hobart and Day Vertical Mixers.**
Steam Jacket Copper Kettles, 10 gal. to 150 gal. capacity.
20 ton and 24 ton CO_2 **Refrigerating Machines.**
2 ton and 10 ton **Ammonia Refrigerating Machines.**
Schultz-O'Neil Dustless Sugar Pulverizers.

Send us your inquiries

SAVAGE BROS. CO.
2632-46 Gladys Ave., Chicago, Ill.

LIQUIDATING EQUIPMENT PURCHASED FROM RIGNEY CANDY (Syrup Dept.) at LOW PRICES

2—**Elgin** automatic oil and syrup fillers—gallons
2—**Lilly & Swenson** Evaporators, 28" x 7'
4—**Pfaudler** glass lined 1000 gal. tanks
2—**Day & Sprout-Waldron** 2000 lb. mixers
1—**Anderson** Dicer No. 2
3—**Baker** horizontal retorts
6—**Robins** Vertical 3 basket retorts
4—**Kiefer, U.S.** rotary and straight lined rinsers
5—60 gal. **Burkhardt** tilt kettles
3—Copper and glass lined vacuum pans
6—**Kiefer, U.S.** and **FMC** belt and chain conveyors
30—**Haller, M. & S., Kiefer, U.S., Fowler, Pneumatic Scale Filling Machines**
4—**Pneumatic Scale, Kramer, Haskins** semi and automatic screw cappers
8—**World, Ermold, National, Burt and Knapp Labelers**

LIQUIDATING SPECIAL PURCHASES FROM AUSTIN NICHOLS AND STANDARD BRANDS — filter presses, pumps, agitators, sifters, mixers, pulpers, powder fillers, etc.

FIRST MACHINERY CORP.
419 LAFAYETTE STREET
New York City • GRamercy 7-6622

Send for Detailed Inventory

Copper Steam Jacketed

★ KETTLES ★

New and Rebuilt Guaranteed, 5 to 500 gal. capacity, with and without agitators, guaranteed steam pressure, immediate shipment.

New nickel, monel and stainless steel steam jacketed kettles, 20 to 500 gal. capacity, with and without agitators.

New copper pulp coils for 500 and 1000 gallon tanks.

HAMILTON COPPER & BRASS WORKS
Hamilton, Ohio
Responsible coppersmiths since 1871

DON'T LET CORROSION STRANGLE YOUR BUSINESS

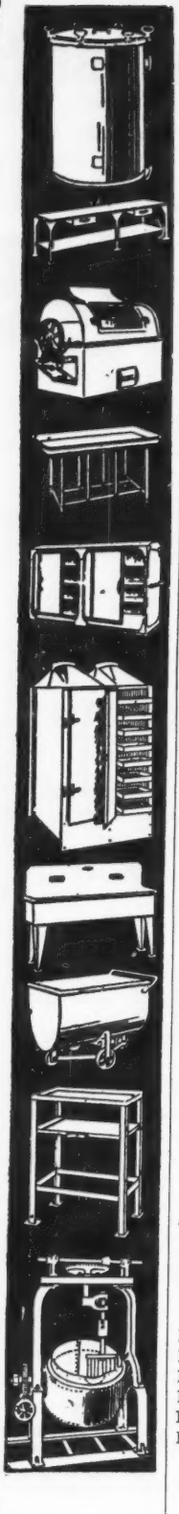
You can't have a profitable business if you consistently fail to meet your production schedules. One of the most prominent causes of slow production is corroded equipment. It runs up huge spoilage costs and is responsible for time lost for needed repair work.

You must consider the problem of new, efficient equipment if you intend to profit from the rush of increased business.

Call in a KOVEN engineer. He can advise you on the design, manufacture and installation of equipment for the food industries—equipment in all commercial and non-corrosive metals that KOVEN has been manufacturing for over 52 years. Such a call obligates you in no way.

Among the many KOVEN products:

Stainless Steel	Mixers, All Kinds
Aluminum Sheet Fabrication	Monel Metal Fabricator
Boxes, Tote, Waste Cans	Pails, Special Heavy
Chemical Apparatus	Pans, All Types, All Metals
Coils and Pipe Bands	Sinks, Scullery and Factory
Copper Sheet Fabrication	Tables, Galvanized or Monel
Galvanizing Work	Tanks, All Types, All Metals
Kettles, All Types, All Metals	



L. O. KOVEN & BRO. INC.

154 OGDEN AVE.
JERSEY CITY, N. J.

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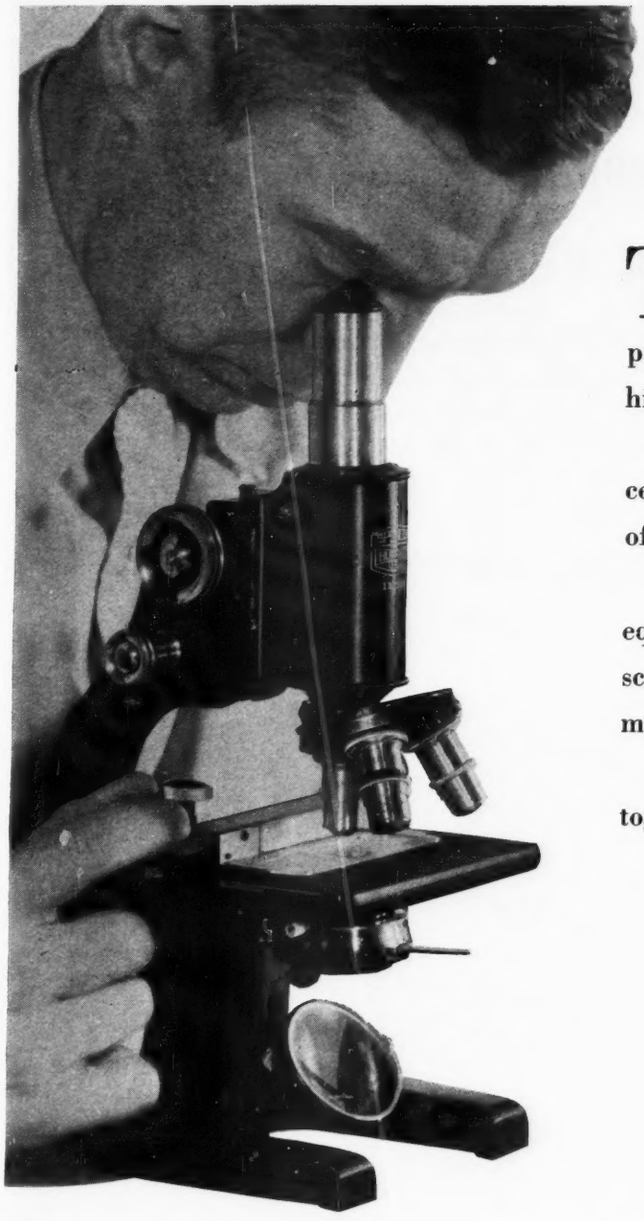
Power to See . . . and Understand gives POWER to CONTROL



THE *right* microscope for his work gives the chemist a new weapon for his attack on the problems of control over the materials brought to his laboratory.

In working with organisms he can identify, count cells, determine the rapidity of growth and the purity of cultures.

In working with inorganic materials with proper equipment, he can identify, count and measure microscopic characteristics, make positive identification by means of optical characteristics.

He can record his results with drawings or photographs.

USE THE MICROSCOPE TO OBTAIN KNOWLEDGE OF:

- **Yeasts, Moulds, Bacterial Growth**
- **Foreign Materials and Adulterants in Foods**
- **Metallic and Mineral Crystals**
- **Particle and Grain Size**
- **Colloids**

The illustration shows the No. 33 Spencer Microscope. May we send you further information? If you will write, outlining your work, our scientific department will suggest specifications for instruments precisely adapted to it.

Spencer Lens Company

Buffalo SPENCER BUFFALO U.S.A. New York

SPENCER LENS COMPANY, Dept. FI-12, Buffalo, N. Y.

Please send me information on ☐ Laboratory Microscopes, ☐ Metallurgical Microscopes, ☐ Low Power Binocular Microscopes, ☐ Refractometer, ☐ Colorimeter.

Please recommend instruments for the following work.....

.....

.....

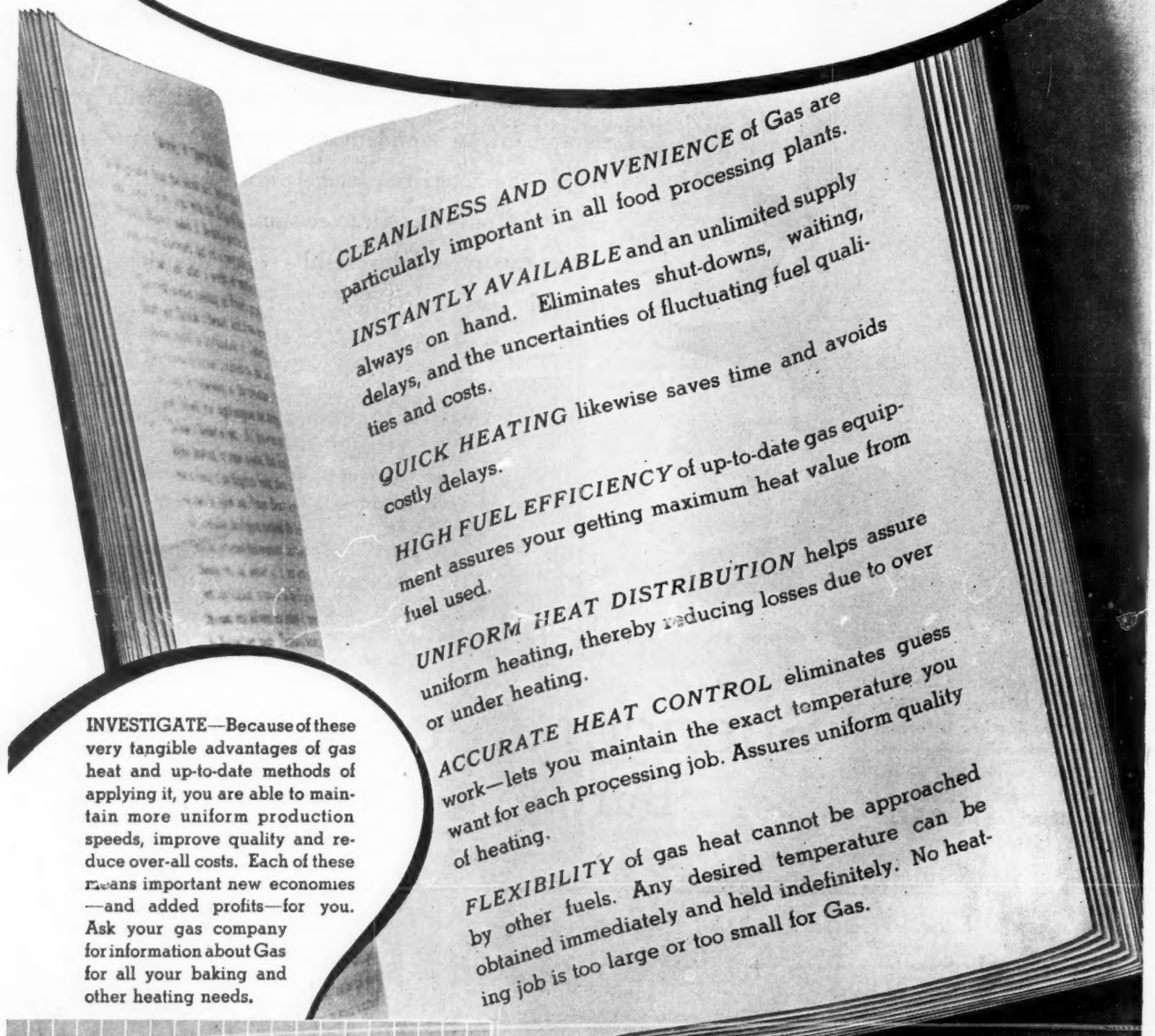
NAME .....

COMPANY .....

STREET NO. ..... *CITY* ..... *STATE* .....

AS FROM AN OPEN BOOK YOU CAN KNOW THE EXTRA VALUES OF GAS FUEL

When you review all the advantages offered by Gas, you know why Gas is the preferred fuel throughout the food industries. Particularly with today's equipment for efficient and economical gas utilization, food processors everywhere are quick to turn these many advantages into profit.


CLEANLINESS AND CONVENIENCE of Gas are particularly important in all food processing plants.
INSTANTLY AVAILABLE and an unlimited supply always on hand. Eliminates shut-downs, waiting, delays, and the uncertainties of fluctuating fuel quali-
ties and costs.
QUICK HEATING likewise saves time and avoids costly delays.
HIGH FUEL EFFICIENCY of up-to-date gas equipment assures your getting maximum heat value from fuel used.
UNIFORM HEAT DISTRIBUTION helps assure uniform heating, thereby reducing losses due to over or under heating.
ACCURATE HEAT CONTROL eliminates guess work—lets you maintain the exact temperature you want for each processing job. Assures uniform quality of heating.
FLEXIBILITY of gas heat cannot be approached by other fuels. Any desired temperature can be obtained immediately and held indefinitely. No heating job is too large or too small for Gas.

INVESTIGATE—Because of these very tangible advantages of gas heat and up-to-date methods of applying it, you are able to maintain more uniform production speeds, improve quality and reduce over-all costs. Each of these means important new economies —and added profits—for you. Ask your gas company for information about Gas for all your baking and other heating needs.

THE TREND TODAY IS TO GAS

THE MODERN COMMERCIAL FUEL

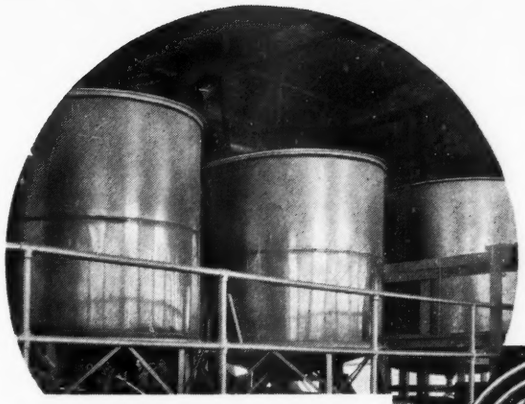
AMERICAN GAS ASSOCIATION

INDUSTRIAL GAS SECTION: 420 LEXINGTON AVENUE, NEW YORK CITY

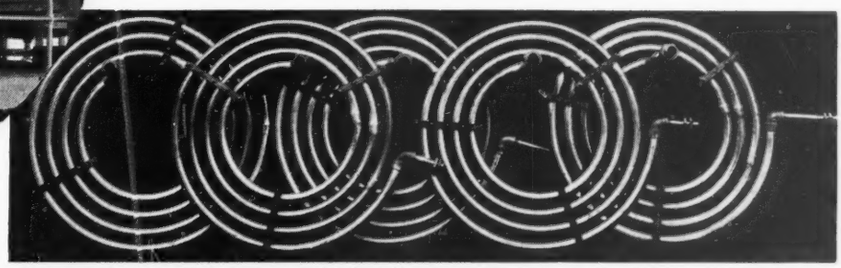
COVERED!

THE NEEDS OF THE FOOD PLANT

...just as this page is covered



• BRINE STORAGE TANKS. *In keeping pure brine and syrups, old fashioned tanks made of wood are difficult to clean and practically impossible to keep sterile and free from harmful bacteria. With Monel Metal mixing and storage tanks, cleaning is made easy and sterilization complete. Illustration shows a battery of three 1000 gallon Monel Metal brine storage tanks at the San Francisco plant of Libby, McNeil and Libby. These have been in daily use for years and are as serviceable now as when installed. Send for copy of "Monel Metal and Nickel for Brining and Syruping."*



• HEATING AND COOLING COILS. *Having strength and toughness greater than mild steel, Monel Metal and Nickel coils for heat transfer purposes permit higher steam pressures and temperatures than coils made of the common materials. Outstanding corrosion resistance assures freedom from harmful metallic contamination and discoloration. Ready amenability to fabrication enables Monel Metal and Nickel coils to meet ordinary and special specifications.*

• TRAYS. *Monel Metal trays for storage, drying, washing, display and transfer purposes are available to order from sheet metal shops everywhere. Stronger than steel, non-rustable, easily cleaned and attractive in appearance, Monel Metal trays are durable and economical.*

These photographs of Monel Metal installations in prominent food plants pretty well cover this page. But they are just a FEW, typical of many others we might have added.

The reasons why Monel Metal is so widely used are also few, but compelling:

Monel Metal does not rust. Is highly resistant to corrosion from brines and most acids. This safeguards PURITY.

Monel is stronger and tougher than steel. These properties, *plus* the other two, make this Nickel alloy outlive other metals by years. Cut down on time for layoffs. LOWER COSTS.

And Monel can be readily fabricated by all regular methods, including welding.

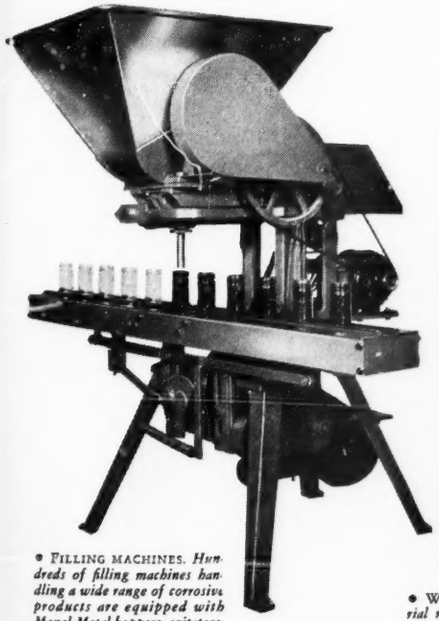
Write for your copy of "Illustrated Guide for Equipping Food Plants." Address:

• • •

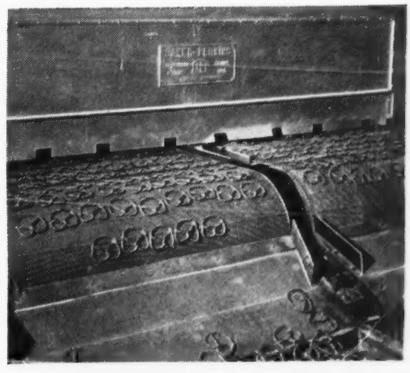
***The* INTERNATIONAL NICKEL COMPANY, INC.**
67 WALL STREET NEW YORK, N. Y.

MONEL METAL

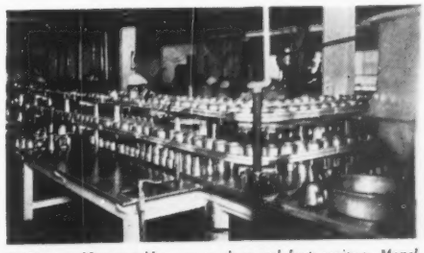
• PROCESSING TANKS. *Large and small, lined and self-supporting Monel Metal tanks are widely used in the Food Industry. This illustration shows a battery of 7 Monel Metal lined tanks at the plant of the California Prune & Apricot Growers Association, San Jose, Calif. These tanks, equipped with perforated false bottom of Monel Metal, are used for the processing of prune juice and other fruits.*



• FILLING MACHINES. *Hundreds of filling machines handling a wide range of corrosive products are equipped with Monel Metal hoppers, agitators, plungers, tubes and machinery parts. The machine shown is used for filling pickles. Monel Metal offers resistance to vinegar and brine solutions, also resistance to wear and low maintenance cost for repairs and replacements.*



• WIRE WOVEN CONVEYOR BELTS. *In wire woven conveyor belts material must be amenable to fabrication to permit bending, twisting and forming—it must be strong and tough to withstand wear and abuse, and it must be corrosion and heat resistant. The illustration shows a Monel Metal conveyor belt approximately 60 ft. long by 52" wide manufactured by the Cambridge Wire Cloth Company, Cambridge, Md., using 3 mesh or ⅜" opening and 0.063" dia. wire. This Monel Metal belt is used in pretzel baking oven.*



• TABLES. *Non-rustable, easy to clean and keep sanitary, Monel Metal tables are long lived and economical. Monel Metal tops can be applied to existing tables, both plain and irregular shapes.*

• BUCKETS. *"Whitehead" Monel Metal buckets are available from stock in 12, 14 and 16 qt. sizes. They are substantially made by electric seam welding. Non-rustable and corrosion-resistant, with glass smooth surfaces which permit quick and thorough cleaning, Monel Metal buckets are cheapest in the long run.*

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

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